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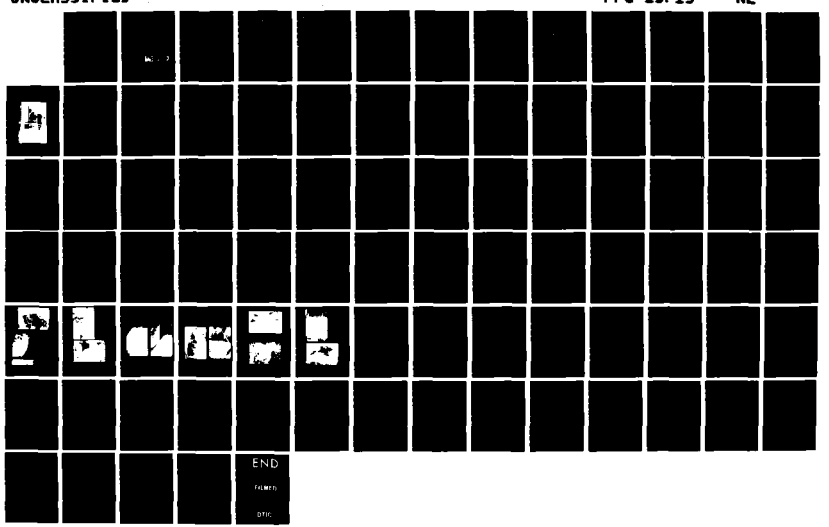

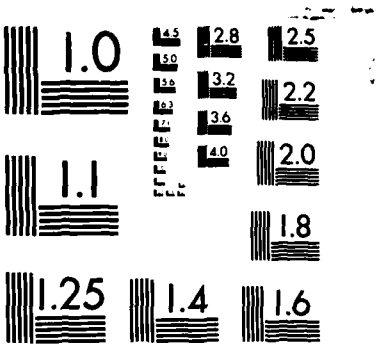

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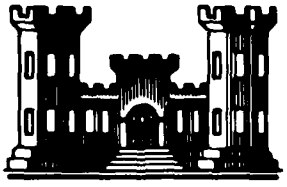
RICHELIEU RIVER BASIN
COLCHESTER, VERMONT

COLCHESTER POND DAM
VT 00056

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Richelieu River Basin
Colchester, VT.
Pond Brook

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam is a reinforced concrete gravity structure about 40 ft. long and 25 ft. high. The dam is considered to be in good condition. No evidence of structural instability was observed, but a slight steep was noted at the ledge contact of the right abutment, which, if allowed to persist, could eventually become great enough to erode the adjacent concrete. It is intermediate in size with a significant hazard potential.

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DEPARTMENT OF THE ARMY
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REPLY TO
ATTENTION OF:
NEDED

MAR 0 6 1981

Honorable Richard A. Snelling
Governor of the State of Vermont
State Capitol
Montpelier, Vermont 05602

Dear Governor Snelling:

Inclosed is a copy of the Colchester Pond Dam (VT-00056) Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Water Resources, the cooperating agency for the State of Vermont. In addition, a copy of the report has also been furnished the owner, Colchester Fire District #3, Colchester, Vermont 05446.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Water Resources for your cooperation in carrying out this program.

Sincerely,

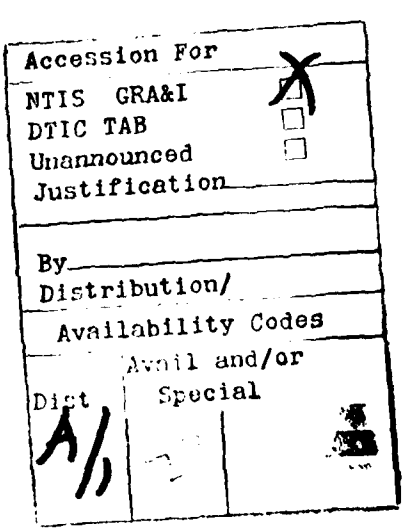
C. E. EDGAR, III
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

COLCHESTER POND DAM
VT 00056

RICHELIEU RIVER BASIN
COLCHESTER, VERMONT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



BRIEF ASSESSMENT
PHASE I INSPECTION REPORT
NATIONAL PROGRAM OF INSPECTION OF DAMS

Identification Number:	VT 00056
Name of Dam:	COLCHESTER POND DAM
Town:	COLCHESTER
County and State:	CHITTENDEN COUNTY, VERMONT
Stream:	POND BROOK
Date of Inspection:	MAY 6, 1980

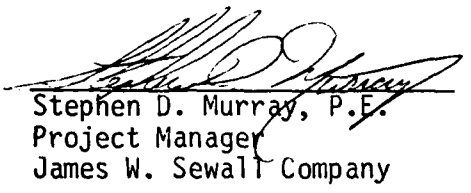
The dam, constructed in 1965, is a reinforced concrete gravity structure approximately 40 feet long and 25 feet in height. The upstream face is vertical; the downstream face is sloped at 3 horizontal to 4 vertical. The dam includes a 30 foot ogee crested spillway, of which about 9 feet is rendered ineffective by an adjacent upstream bridge abutment. The reinforced concrete outlet structure at the right abutment contains a valved 6 inch diameter low level drain, two gated 12 inch inlet ports at higher elevations, and a 12 inch valved outlet which originally fed the water system. All gates and valves are reported to be operable.

The dam impounds Colchester Pond and the discharge, Pond Brook, flows in a northwesterly direction approximately 4.2 miles to its mouth at Lake Champlain. Originally constructed as a water supply facility, the structure is now used to maintain the level of Colchester Pond. The pond is 5500 feet in length with a surface area of 182 acres. Normal storage capacity is about 2350 acre-ft.

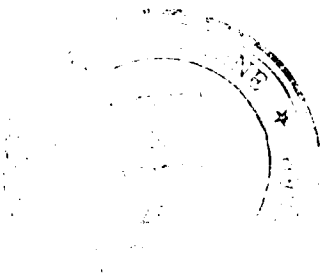
Based on the visual inspection and the review of available data regarding this facility, the dam is considered to be in GOOD condition. No evidence of structural instability was observed, but a slight seep was noted at the ledge contact of the right abutment, which, if allowed to persist, could eventually become great enough to erode the adjacent concrete.

In accordance with the Corps of Engineers Guidelines and the size (INTERMEDIATE) and hazard (SIGNIFICANT) classification of this dam, the Test Flood selected was equivalent to one-half the Probable Maximum Flood (PMF). Peak inflow to Colchester Pond is 2000 cfs; routed peak outflow from the dam is 550 cfs with the water elevation 1.25 feet below the top of dam. The spillway capacity is 850 cfs or about 155 percent of the routed Test Flood outflow from the dam.

It is recommended that the owner engage a qualified registered engineer to access the necessity and means to stop the seepage at the right abutment. This and remedial measures which are discussed in Section 7 should be instituted within two years of the owner's receipt of this report except as otherwise noted.



Stephen D. Murray, P.E.
Project Manager
James W. Sewall Company



This Phase I Inspection Report on Colchester Pond Dam (VT-00056) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

JOSEPH W. FINEGAN, JR., CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff"), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

TABLE OF CONTENTS

.5 DAM FAILURE ANALYSIS

Utilizing the April, 1978, "Rule of Thumb Guidance for Estimating Downstream am Failure Hydrographs", the peak failure outflow with the pool initially at he top of the dam (el. 388.0 NGVD) would be approximately 2800 cfs. Storage ownstream of the dam would not significantly attenuate the peak failure ischarge until flow reached the relatively flat area downstream of U.S. Route 2/7 ome 2.5 miles from the dam.

The prefailure flood would produce a substantial pool upstream of the 35 foot entral Vermont Railroad embankment located 2000 feet downstream of the dam, and ould overtop two town roads 1 and 2 miles from the dam. The failure flood ould overtop the railroad embankment by 0.7 feet causing damage to the track nd the fill, resulting in possible derailment with consequent damage to rolling tock and hazard to passengers and crew. Further downstream, the failure flood ould overtop the two town roads, assumed washed out by the prefailure flood, by bout 2.4 feet and likely cause some damage to U.S. Route 2/7 about 2.5 miles rom the dam. There would be substantial agricultural flooding along the entire ourse of Pond Brook. Damage to the railroad creates the potential for loss of ot more than a few lives. Thus Colchester Pond Dam has been classified as a Significant Hazard" dam.

ECTION 5: EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

.1 GENERAL

The project is basically a low surcharge storage-high spillage gravity dam, riginally constructed for public water supply.

The tributary watershed consists of 1.85 square miles of relatively undevel- ped terrain, approximately 70% wooded and containing no significant storage ther than Colchester Pond. Colchester Pond has a surface area of 182 acres onstituting about 15% of the total drainage area. NGVD elevations within the atershed range from 380 feet to over 700 feet. Average watershed slope is bout 9.5%, which in the absence of significant storage would be considered ountainous. Because of the relatively large pond area, however, the watershed as considered rolling for hydrologic purposes.

Adjacent to and upstream of the dam, a roadway bridge crosses the approach hannel with its bottom steel about 8.6 feet above the spillway crest and its butments contacting the upstream dam face.

Hydraulics computations indicate that the dam would control the outflow t elevations below the bridge steel; at higher elevations the bridge and adja- ent roadway would act as a weir controlling outflow to Pond Brook. The pillway would accommodate 100% of the routed Test Flood outflow from the dam ith an average surcharge above the spillway crest of 3.75 feet. With surcharge o the top of dam, the spillway would accommodate 155% of the routed Test Flood utflow from the dam.

.2 DESIGN DATA

No design data are known to exist for this project.

.3 EXPERIENCE DATA

No information on serious problem situations arising at this dam was found nd it does not appear that the water level has ever reached sufficient eleva- ion to overtop the dam or create a hazard to any dam component.

.4 TEST FLOOD ANALYSIS

The Test Flood for this significant hazard, intermediate size dam ranges rom one-half of the Probable Maximum Flood (PMF) to the Probable Maximum Flood. ne-half of the PMF was selected as the Test Flood since Colchester Pond Dam is t the lower end of the intermediate size classification and poses a relatively ow risk to populated areas.

Peak inflow to Colchester Pond is 2000 cfs and was determined using the Rolling" guide curve of the "Preliminary Guidance for Estimating Maximum robable Discharge", dated March, 1978. Peak outflow is 550 cfs with the water levation 1.25 feet below the top of dam and the initial reservoir level assumed t the crest of the spillway (el. 383.0 NGVD). Based upon hydraulics com- utations, the maximum spillway capacity is 850 cfs, or approximately 155% of he routed Test Flood outflow.

SECTION 4: OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 OPERATIONAL PROCEDURES

a. General - This dam is no longer used for water supply and no operating procedure, as such, is known to exist.

b. Warning System - No warning system is known to exist.

4.2 MAINTENANCE PROCEDURES

a. General - The dam receives no regular maintenance and is not visited frequently.

b. Operating Facilities - No formal plan for the maintenance of operating facilities is known to exist. The gate stands and operating handwheels appear in good condition and show no sign of misuse.

4.3 EVALUATION

The operation and maintenance procedures at this dam are inadequate to ensure that all problems encountered can be remedied within a reasonable period of time. The owner should establish a written operation and maintenance procedure as well as a downstream warning system to follow in the event of an emergency at the dam.

e. Downstream Channel - The channel directly below the dam is heavily wooded with steep sides and bottom as shown in Photo 10. Pond Brook flows through the wooded area from the center to the upper right of Photo 9. A 35 foot high Central Vermont Railroad embankment 2000 feet downstream, beneath which the brook passes, is also visible in this photo. The 5 foot culvert under the embankment is shown in Photo 11.

Further downstream, the brook passes under two Town roads 1 and 2 miles from the dam, and the channel banks remain primarily wooded. The upstream Town road crossing is shown in Photo 12. About 2.5 miles downstream from the dam, the brook passes under U.S. Route 2/7, receiving flow from three tributaries from there to its mouth at Lake Champlain, about 4.2 miles downstream of the dam.

3.2 EVALUATION

On the basis of the visual examination the dam is considered to be in good condition.

The minor leakage on the downstream face at the right abutment, if uncorrected, could develop into a future erosion problem.

The handrail around the operating platform, if allowed to deteriorate, could create a safety hazard to operating personnel.

The heavily wooded condition of the downstream channel reduces the hydraulic efficiency of the channel and could result in downstream blockages and consequent damage during flood flows.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General - The visual inspection of the dam was conducted on May 6, 1980. At that time, the water level of the reservoir was about 1 inch above the spillway. The weather was sunny and mild. The general condition of the dam is good.

b. Dam - The dam is a reinforced concrete gravity structure with an operating platform at the right abutment 5 feet above the crest. The operating platform is shown in Photo 1. All visible concrete components of the dam appear in good condition.

There is a minor amount of clear leakage coming from the downstream contact of the right abutment with the ledge as shown in Photo 2.

A roadway bridge, visible in Photos 3 and 4 and in the Overview Photo, exists directly upstream from the dam with its concrete abutments immediately adjacent to the dam.

c. Appurtenant Structures

Spillway

As shown in Photo 4, the major portion of the dam consists of the 30 foot long spillway section with the 10 foot long gate structure to the right of the spillway. The spillway has an ogee crest and a downstream slope of 3 horizontal to 4 vertical. Very minor erosion of the downstream face has made the construction joints visible as shown in Photos 5 and 6. The left abutment of the upstream roadway bridge obstructs flow to a portion of the spillway as shown in Photo 7.

Outlet Structure

A 6 inch low level drain shown in Photo 8, exits at the bottom of the dam about a foot above the stream channel. This outlet is sufficiently low to relieve hydrostatic pressure from the dam and to facilitate dam repair, and is piped through the outlet structure. The outlet structure is equipped with two 12 inch intakes, the lowest being 1 foot above the 6 inch pipe. These serve the valved 12 inch outlet which formerly supplied the water system, and which, it is presumed, could be used as an auxiliary pond drain. The gate and valve mechanisms, so far as are visible, appear in good condition and are reported operable. The handrail around the operating platform of the outlet structure is in good condition with some minor rusting as shown in Photo 1.

d. Reservoir Area - The area surrounding the reservoir is essentially rural with a mixture of woods and open fields as shown in Photo 9. There are no indications of instability along the banks of the reservoir in the vicinity of the dam.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Available Data - The available data consists of sheets 1 and 2 of original contract drawings by Whitman and Howard, Inc., Engineers, dated March, 1960.

b. Design Features - The drawings, computations and inspection reports indicate the design features stated in Section 1.

c. Design Data - Design data consists of information on the two contract drawings by Whitman and Howard as listed in "Available Data".

2.2 CONSTRUCTION

a. Available Data - Information as contained in any plans, drawings, or specifications previously listed in "Design Data" or Appendix B.

b. Construction Considerations - Some variations were noted in the dam as built compared to the original contract drawings. The original plans provided for the gate structure to be near the center of the dam and to be served by a steel service bridge from the left abutment. This gate structure was moved to the right abutment to take advantage of a ledge projection and to eliminate the service bridge. The crest of the spillway was raised to elevation 383.0 rather than elevation 380.0 shown on the original contract drawings.

2.3 OPERATION

Pond level readings are not taken on any regular schedule. This dam and reservoir are not currently being used for water supply and no formal operating procedures are known to exist.

2.4 EVALUATION

a. Availability - Existing data was provided by the State of Vermont Agency of Environmental Conservation, and Colchester Fire District No. 3 (the owner).

b. Adequacy - Detailed hydrologic/hydraulic data were not available. Design data and field measurements were utilized in conjunction with New England Division - Army Corps of Engineers "Preliminary Guidance for Estimating Maximum Probable Discharges" to perform the computations of outflow capacity.

The detailed engineering data required to perform an in-depth stability analysis of the dam was not available. The final assessment of the dam, therefore, must be based primarily on visual inspection, performance history, and spillway capacity computations.

c. Validity - A comparison of records, data, and visual observations reveals no significant discrepancies, other than those noted above between design and as-built dimensions.

j. Regulating Outlets

1.	Invert:	366.75
2.	Size:	6 inch diameter
3.	Description:	Cast iron waste pipe discharging to downstream channel
4.	Control mechanism:	Gate operated by hand-wheel at control structure
5.	Other:	12 inch increasing to 16 inch gated cast iron water supply pipe discharging to chlorination station - not currently in use

4.	Test flood pool:	182 ± acres
5.	Top of dam:	182 acres
g.	Dam	
1.	Type:	concrete gravity
2.	Length:	40 ± ft
3.	Height:	25 ± ft
4.	Top Width:	2.5 ± ft
5.	Side Slopes:	3H to 4V D/S Vertical U/S
6.	Zoning:	N/A
7.	Impervious core:	N/A
8.	Cutoff:	N/A
9.	Grout curtain:	N/A
10.	Other:	N/A
h.	Diversion and Regulating Tunnel	N/A
i.	Spillway	
1.	Type:	concrete ogee
2.	Length of weir:	30 ± ft
3.	Crest elevation:	383.0
4.	Gates:	N/A
5.	Upstream channel:	31 ft span between bridge abutments
6.	Downstream channel:	original streambed
7.	General:	9 feet of spillway ineffective - located behind bridge abutment

c. Elevation (Feet, NGVD)

1.	Streambed at toe of dam:	363 ±
2.	Bottom of cutoff:	N/A
3.	Maximum tailwater:	366.8 ±
4.	Recreation pool:	N/A
5.	Full flood control pool:	N/A
6.	Spillway crest (ungated):	383.0
7.	Design surcharge:	N/A
8.	Top of dam:	388.0
9.	Test flood surcharge:	386.75

d. Reservoir

1.	Length of normal pool:	5500 ft
2.	Length of flood control pool:	N/A
3.	Length of spillway crest pool:	5500 ft
4.	Length of pool at top of dam:	5500 ft
5.	Length of test flood pool:	5500 ft

e. Storage

1.	Normal pool:	2350 acre-ft
2.	Flood control pool:	N/A
3.	Spillway crest pool:	2350 acre-ft
4.	Top of dam:	3260 acre-ft
5.	Test flood pool:	3030 acre-ft

f. Reservoir Surface

1.	Normal pool:	182 acres
2.	Flood control pool:	N/A
3.	Spillway crest:	182 acres

i. Normal Operational Procedures - All gates in the outlet structure are normally tightly closed and locked and all four hand-wheels are reported operable. There are no regular operational procedures other than occasional checking.

1.3 PERTINENT DATA

a. Drainage Area - 1.82 square miles of moderately steep, relatively undeveloped terrain which is about 30% open and 70% wooded.

b. Discharge at Dam Site - Discharge is over the spillway and through two gated cast iron outlet pipes. One is a 6 inch low level drain and the other a 12 inch water supply conduit which increases to 16 inches just downstream of the dam. Elevations are in feet referenced to NGVD datum.

1.	Outlet works (conduits) capacity at top of dam el. 388.0:	
	One 6" cast iron pipe @ invert el. 366.75	2± cfs
	One 12" increasing to 16" cast iron pipe @ invert el. 367.0	N/A
2.	Maximum known flood at damsite:	N/A
3.	Ungated spillway capacity at top of dam el. 388.0:	850± cfs
4.	Ungated spillway capacity at test flood el. 386.75:	550± cfs
5.	Gated spillway capacity at normal pool el. 383.0:	N/A
6.	Gated spillway capacity at test flood el. 386.75:	N/A
7.	Total spillway capacity at test flood el. 386.75:	550± cfs
8.	Total project discharge at top of dam el. 388.0:	852± cfs
9.	Total project discharge at test flood el. 386.75:	552± cfs

6 inch diameter valved low level drain with a center line elevation of 367.5. All three inlets are equipped with trashracks and screens. As the dam is no longer used for water supply, the 12" diameter valved outlet which originally fed the water system remains permanently closed. Access to the handwheel gate controls is via the right embankment.

Elevations are in feet referenced to NGVD datum.

No instrumentation exists at this dam.

c. Size Classification - INTERMEDIATE - The dam impounds approximately 3260 acre-feet with the pond level at the top of the dam, which at elevation 388 is 25 feet above the streambed. According to the Recommended Guidelines, the dam is classified as intermediate in size since its impoundment is between 1,000 and 50,000 acre-feet.

d. Hazard Classification - SIGNIFICANT - If the dam were to be breached, there is potential for considerable downstream damage and loss of no more than a few lives. The Central Vermont Railroad tracks cross Pond Brook on a 35 foot high embankment about 2000 feet downstream of the dam. This embankment would be overtopped by about 0.7 feet resulting in damage to the track and a possible serious derailment. Considerable flooding of agricultural land, both upstream and downstream of the railroad embankment, would ensue. Two town roads, 1 and 2 miles downstream of the dam, presumably washed out by the pre-failure flow because of the relatively small bridges under them, would receive further damage from the approximate 5 foot submergence resulting from the breach. U.S. Route 7, about 2.5 miles downstream of the dam, would likely receive relatively minor damage.

e. Ownership - Colchester Fire District #3
Colchester, Vermont 05446
(802) 658-6616

The dam was built for its present owner.

f. Operator - Clifford Morrie
1 Wintergreen Drive
Colchester, Vermont 03446
Home (802) 879-0969
Office (802) 655-0813

g. Purpose of Dam - The dam was originally constructed for water supply and was used as such for 12 years. The area is now served by the Champlain Water District. As there is no public access to the pond, except at the dam site, recreational use is minimal. Except for maintenance of pond level for local asthetic purposes, the dam now serves no function.

h. Design and Construction History - The following information is believed to be accurate based upon available plans and correspondence and conversations with persons familiar with the history of the dam. The dam was designed in 1960 by Whitman and Howard Engineers, Inc. for Fire District No. 3, Colchester, Vermont. A public hearing as required by the state was held on May 19, 1960 and a Hearing Order was issued on July 15, 1960, allowing the project to proceed to construction. The dam was completed in 1965.

PHASE I INSPECTION REPORT

COLCHESTER POND DAM

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority - Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. James W. Sewall Company has been retained by the New England Division to inspect and report on selected dams in the State of Vermont. Authorization and notice to proceed were issued to James W. Sewall Company under a letter of April 2, 1980 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW 33-80-C-0051 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection Program - The purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interests.

2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.

3. To update, verify and complete the National Inventory of Dams.

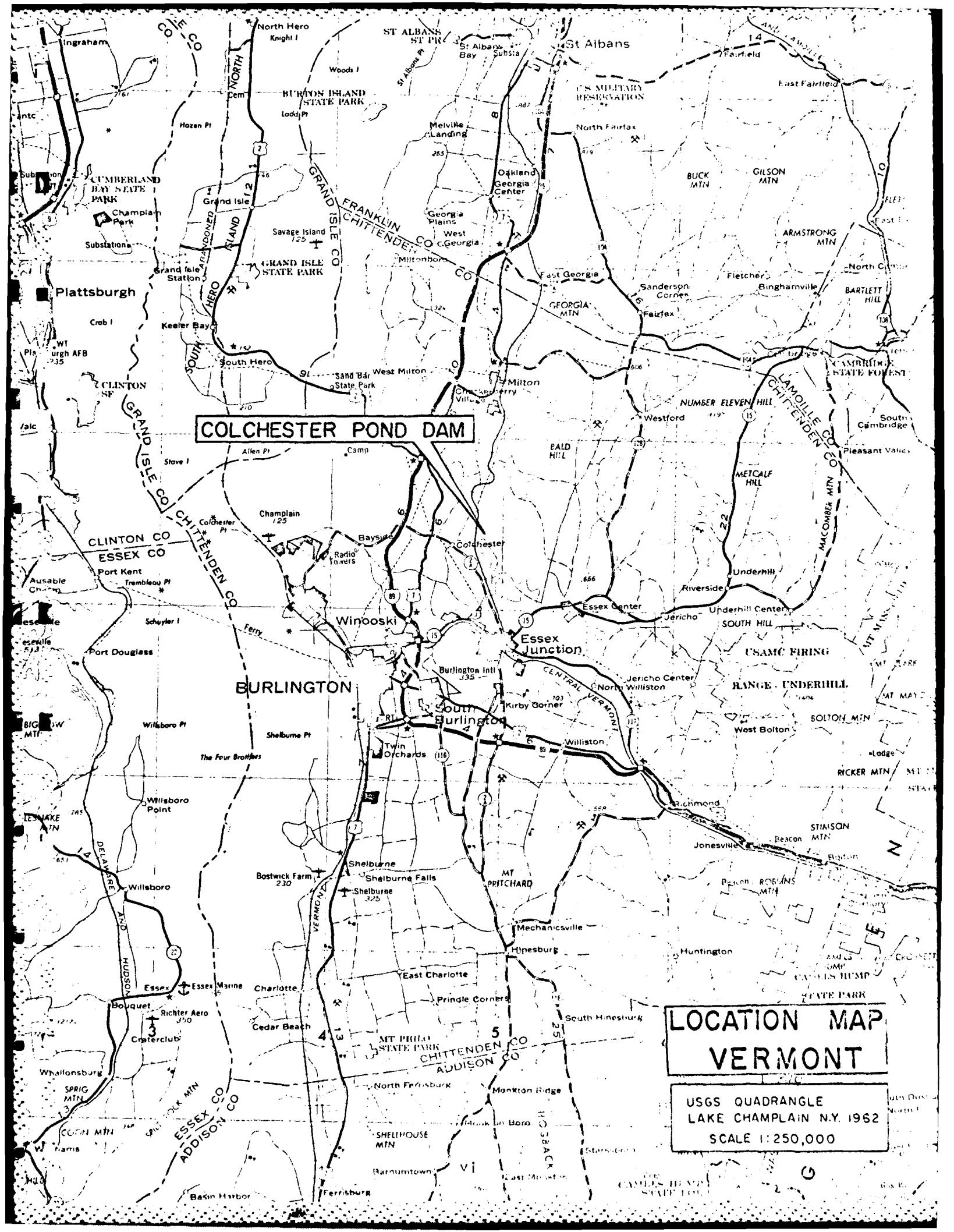
1.2 DESCRIPTION OF PROJECT

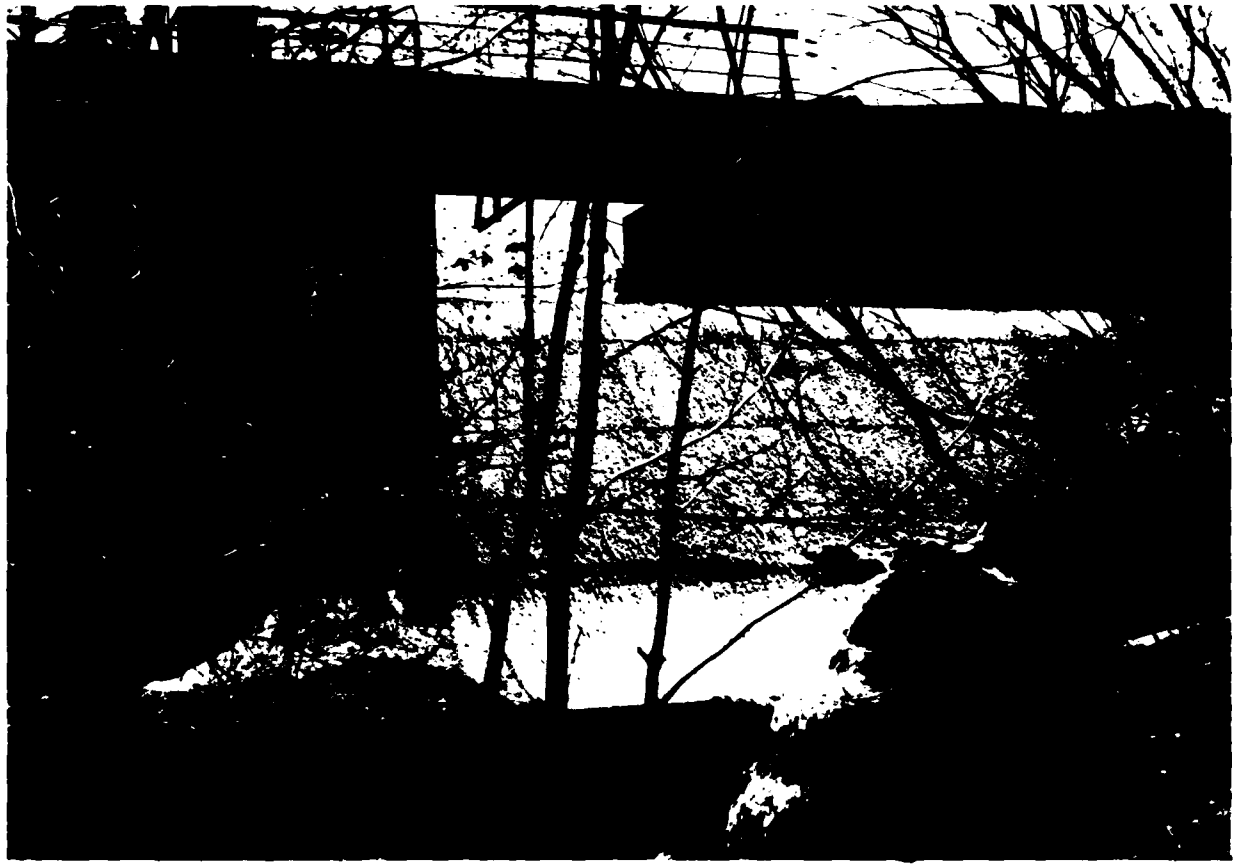
a. Location - The dam is located on the headwaters of Pond Brook about 4.2 miles upstream from Lake Champlain in a rural area of the Town of Colchester, County of Chittenden, State of Vermont. The dam is shown on the Colchester, VT. USGS Quadrangle Map having coordinates latitude N 44°-32.9' and longitude W 73°-07.5'. The dam is also known as Pond Brook Reservoir Dam.

b. Description of Dam and Appurtenances - The dam, completed in 1965, is a concrete gravity structure built on exposed bedrock, having a total length of 40 feet. This includes a 30 foot long spillway section on the left of the dam and a 10 foot long gate structure on the right.

The ogee crest spillway has a top elevation of approximately 383 and a downstream slope of 3 horizontal to 4 vertical. Immediately upstream of the dam is a roadway bridge with a 31 foot span. The left bridge abutment blocks any direct flow to the leftmost 9 feet of the spillway section.

The gate structure has a top elevation of approximately 388, a maximum of 25 feet in height above the streambed. The structure has two gated inlet ports, 12 inches in diameter with center line elevations of 370 and 377. There is a


COLCHESTER POND DAM
LOCATION MAP
VERMONT
USGS QUADRANGLE
LAKE CHAMPLAIN N.Y. 1962
SCALE 1:250,000
Plattsburgh
BURLINGTON
Winooski
Essex Junction
St Albans
Colchester
Milton
South Hero
Grand Isle
North Hero
Westford
Fairfax
Georgia
Fairfield
Swanton
Ingraham
Keeler Bay
Grand Isle Station
Champlain Park
Substations
Hazen Pt
Woods I
Knight I
Stave I
Allen Pt
Camp
Colchester Pt
Baysido
Radio Towers
Port Kent
Trembleau Pt
Ausable Chasm
Schuyler I
Ferry
Port Douglass
Willsboro Pt
Shelburne Pt
The Four Brothers
Willsboro Point
Willsboro
Essex
Essex Marine
Bouquet
Richter Aero
Crafterclub
Whallonsburg
Bostwick Farm
Shelburne
Shelburne Falls
Twin Orchards
Burlington Intl
Kirby Corner
South Burlington
Williston
Jericho Center
North Williston
Essex Center
Jericho
Underhill
Underhill Center
Riverside
Westford
Pleasant Valley
South Cambridge
Fletcher
Binghamville
Sanderson Corner
East Georgia
Georgia Center
Georgia Plains
West Georgia
Oakland
Melville Landing
North Fairfax
East Fairfield
Mechanicsville
Hinesburg
Huntington
Richmond
Jonesville
Beacon
Boston
East Charlotte
Charlotte
Pringle Corners
South Hinesburg
North Ferrisburg
Monkton Ridge
Monkton Boro
Starksboro
Barnumtown
Ferrisburg
Basin Harbor
West Milton
Sand Bar State Park
Milton Ferry
Cumberland Bay State Park
Grand Isle State Park
Burton Island State Park
Savage Island
Lodd Pt
Melville Landing
St Albans Bay
St Albans Pt
St Albans Substa
U.S. Military Reservation
Buck Mtn
Gilson Mtn
Armstrong Mtn
Georgia Mtn
Number Eleven Hill
Bald Hill
Metcalf Hill
Macomber Mtn
Usamc Firing Range - Underhill
Bolton Mtn
West Bolton
Ricker Mtn
Stimson Mtn
Robbins Mtn
Mt Pritchard
Camels Hump
Mt Philo State Park
Sprig Mtn
Cobb Mtn
Shelhouse Mtn
Hogback Mtn
Lemon Fair
Lewis Creek
Dead Creek
Otter Creek
Lake Champlain
Grand Isle Co
Chittenden Co
Franklin Co
Lamoille Co
Clinton Co
Essex Co
Addison Co
Abandoned
Central Vermont
Delaware And Hudson
Vermont
Cambridge State Forest



OVERVIEW PHOTO

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Colchester Pond Dam - VT 00056
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		Colchester, Vermont
		May 6, 1980

SECTION 6: EVALUATION OF STRUCTURAL STABILITY

6.1 VISUAL OBSERVATIONS

Visual inspection did not disclose any immediate stability problems. The minor seepage observed at the contact of the concrete dam and bedrock on the right abutment does not indicate immediate stability problems.

6.2 DESIGN AND CONSTRUCTION DATA

No original design and construction data are available for this dam.

6.3 POST CONSTRUCTION CHANGES

There is no record of post construction changes.

6.4 SEISMIC STABILITY

The dam is located in Seismic Zone 2, and in accordance with the recommended Phase 1 guidelines does not warrant seismic investigation.

SECTION 7: ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition - Based upon the visual inspection, the dam is judged to be in good condition.

b. Adequacy of Information - Due to the lack of design and construction data for this dam, the assessment of safety is based on the visual inspection.

c. Urgency - Except as noted, the remedial measures and recommendations presented below should be implemented by the owner within two years after receipt of this Phase I Inspection Report.

7.2 RECOMMENDATIONS

The owner should engage a qualified registered engineer to assess the necessity and means to stop the seepage at the right abutment.

The owner should implement all recommendations by the engineer.

7.3 REMEDIAL MEASURES

a. A program of biennial technical inspection, with repairs as necessary, should be instituted by the owner.

b. A formal downstream warning system to be implemented in the event of an emergency at the dam should be developed by the owner within one year of the receipt of this report by the owner.

c. A formal program of operation and maintenance procedures should be instituted and fully documented to provide accurate records for future reference.

d. The owner should arrange for the removal of trees from the downstream channel within 50 feet of the dam toe.

e. The handrail around the operating platform should be painted and maintained.

7.4 ALTERNATIVES

Removal of this dam may be a practical alternative to the above recommendations.

APPENDIX A

VISUAL CHECK LIST WITH COMMENTS

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT Calaveras Dam DATE May 6, 1980

TIME 11 A.M.

WEATHER Fair, windy

W.S. ELEV. _____ U.S. _____ DN.S.

PARTY:

1. Stephen D. Murray S.D.M. 6. _____
2. [illegible] R.L.A. 7. _____
3. [illegible] C.A.H. 8. _____
4. David P. LaGorio D.P.L. 9. _____
5. _____ 10. _____

PROJECT FEATURE	INSPECTED BY	REMARKS
1. [illegible] Dam	SDM, RLA, CAH, DPL	
2. Gate Structure	SDM RLA CAH	
3. Outlet Conduit	SDM RLA CAH	
4. Outlet Channel	[illegible] CAH DPL	
5. Spillway Weir, Transverse Joints	SDM, RLA, CAH, DPL	
6.		
7.		
8.		
9.		
10.		

PROJECT [illegible] Dam — DATE [illegible]

PROJECT FEATURE Concrete Dam — NAME [illegible]

DISCIPLINE [illegible] Co. Geotechnical Services Inc. — NAME [illegible]

AREA EVALUATED	CONDITION
DAM EMBANKMENT	The dam is a concrete gravity [illegible] founded on [illegible] with [illegible] at each abutment and [illegible] the downstream toe.
Crest Elevation 823.0 (MSL)	
Current Pool Elevation [illegible]	
Maximum Impoundment to Date	
Surface Cracks	There are a few minor surface cracks
Pavement Condition	Good
Movement or Settlement of Crest	None observed
Lateral Movement	None observed
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	There is a small amount of seepage at the at the intersection of the upstream face and the left abutment on the right.
Indications of Movement of Structural Items on Slopes	None observed
Trespassing on Slopes	No
Sloughing or Erosion of Slopes or Abutments	N.A.
Rock Slope Protection - Riprap Failures	N.A.
Unusual Movement or Cracking at or Near Toe	None observed
Unusual Embankment or Downstream Seepage	No
Piping or Boils	N.A.
Foundation Drainage Features	None
Toe Drains	N.A.
Instrumentation System	None
Vegetation	[illegible]

PERIODIC INSPECTION CHECKLIST

PROJECT [illegible] Dam — DATE [illegible]

PROJECT FEATURE [illegible] — NAME [illegible]

DISCIPLINE [illegible] Geotechnical Engineers Inc. — NAME [illegible]

AREA EVALUATED	CONDITION
DIKE EMBANKMENT	There is no dike on this project.
Crest Elevation	
Current Pool Elevation	
Maximum Impoundment to Date	
Surface Cracks	
Pavement Condition	
Movement or Settlement of Crest	
Lateral Movement	
Vertical Alignment	
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	
Indications of Movement of Structural Items on Slopes	
Trespassing on Slopes	
Sloughing or Erosion of Slopes or Abutments	
Rock Slope Protection - Riprap Failures	
Unusual Movement or Cracking at or Near Toes	
Unusual Embankment or Downstream Seepage	
Piping or Boils	
Foundation Drainage Features	
Toe Drains	
Instrumentation System	
Vegetation	

PROJECT [illegible] DATE [illegible]

PROJECT FEATURE [illegible] NAME [illegible]

DISCIPLINE [illegible] NAME [illegible]

Geotechnical Engineer

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	No approach channel. Intake is below water surface.
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	
Stop Logs and Slots	

PERIODIC INSPECTION CHECKLIST

PROJECT Colorado River Dam — DATE [illegible]

PROJECT FEATURE Gate Structure — NAME [illegible]

DISCIPLINE [illegible] Engineer — NAME C.A.H. D.F.L.

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	Good
Condition of Joints	Good
Spalling	None
Visible Reinforcing	None
Rusting or Staining of Concrete	Minor rust stains
Any Seepage or Efflorescence	None, see Sheet A-2
Joint Alignment	N.A.
Unusual Seepage or Leaks in Gate Chamber	No
Cracks	None
Rusting or Corrosion of Steel	Minor rust on railing.
b. Mechanical and Electrical	
Air Vents	N.A.
Float Wells	N.A.
Crane Hoist	N.A.
Elevator	N.A.
Hydraulic System	N.A.
Service Gates	Good
Emergency Gates	Good
Lightning Protection System	N.A.
Emergency Power System	N.A.
Wiring and Lighting System	[illegible]

PROJECT _____ DATE _____

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	There is a 6 inch waste pipe from the downstream face of the wall and a 12 inch discharge pipe for water supply which is not being used.

PERIODIC INSPECTION CHECK

PROJECT _____ DATE _____

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain holes	
Channel	Channel is grass lined.
Loose Rock or Trees Overhanging Channel	Channel sides are very steep and have many overhanging trees
Condition of Discharge Channel	General condition is poor.

PERIODIC INSPECTION CHECKLIST

PROJECT Coleen Tr Park Dam DATE Nov 6 1979

PROJECT FEATURE Emergency Spillway NAME Emergency Spillway

DISCIPLINE Dam Safety Engr. NAME [illegible]
Geotechnical Engineers Inc.

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Beyond reservoir
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Concrete	Good
Rust or Staining	Minor rust stains
Spalling	None visible
Any Visible Reinforcing	No
Any Seepage or Efflorescence	None visible
Drain Holes	
c. Discharge Channel	See Outlet channel
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Channel	
Other Obstructions	

PERIODIC INSPECTION CHECK LIST

OJECT Colorado River Dam DATE March 1982

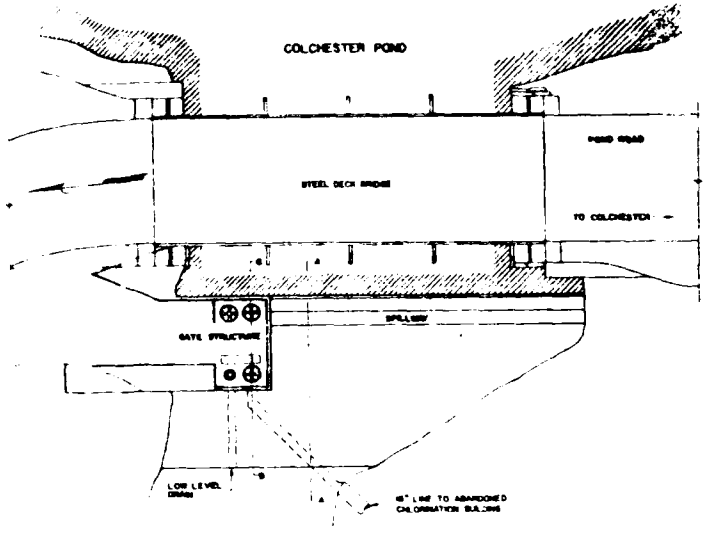
OJECT FEATURE _____ NAME [illegible]

SCIPLINE [illegible] for NAME [illegible]
Geotechnical Engineers Inc.

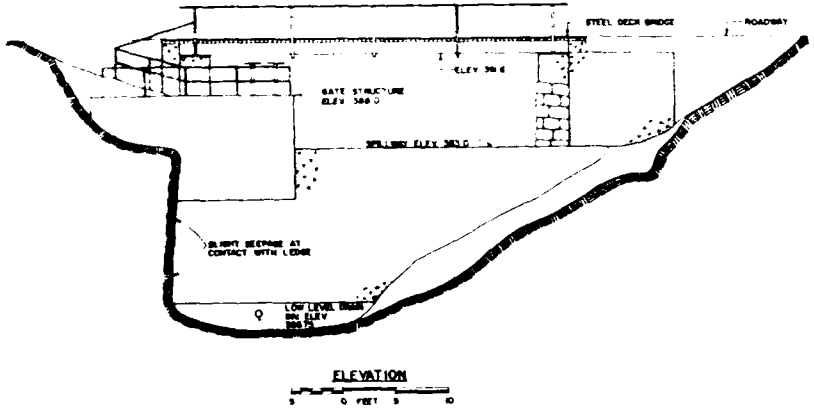
AREA EVALUATED	CONDITION
UTLET WORKS - SERVICE BRIDGE	Trace of [illegible]
. Super Structure	
Bearings	
Anchor Bolts	
. Bridge Seat	
Longitudinal Members	
Underside of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
›. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

APPENDIX B

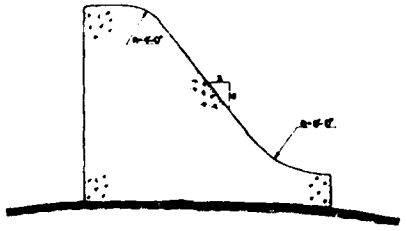
ENGINEERING DATA



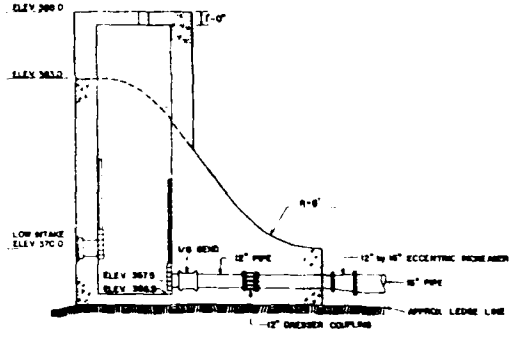
PLAN



ELEVATION



SECTION A-A



SECTION B-B
THROUGH DISCHARGE PIPE

NOTE: THIS PLAN COMPILED FROM EXISTING PLANS FOR DAM CONSTRUCTION IN 1965 BY WHITMAN AND HOWARD, INC. ENGINEERS, AND MODIFIED AS OBSERVED IN THE FIELD

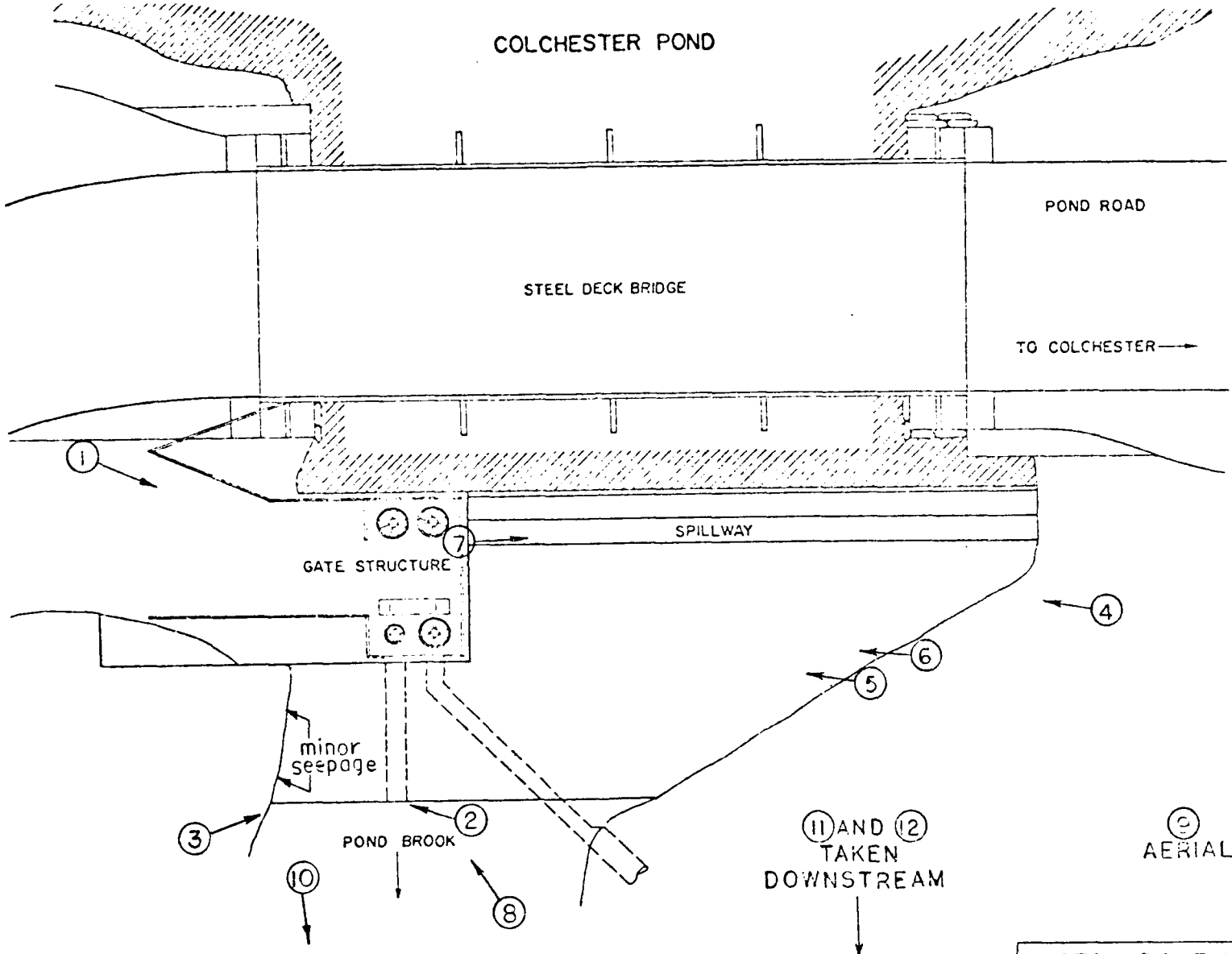
U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

AMES W. SEWALL COMPANY
CONSULTING ENGINEERS

NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS

COLCHESTER POND DAM
COLCHESTER, VT

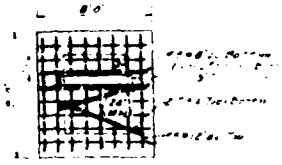
P-1


COLCHESTER POND
POND ROAD
STEEL DECK BRIDGE
TO COLCHESTER
SPILLWAY
GATE STRUCTURE
minor seepage
POND BROOK
11 AND 12 TAKEN DOWNSTREAM
9 AERIAL
PHOTO LOCATION PLAN
COLCHESTER POND DAM

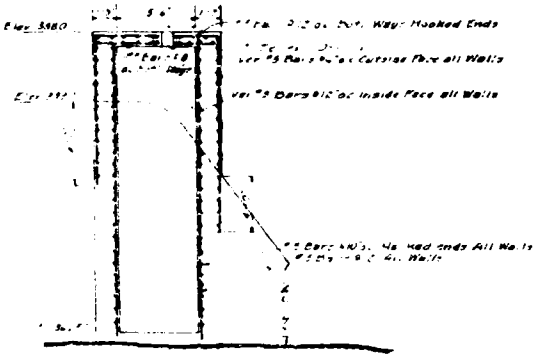
C-1

APPENDIX C

DETAIL PHOTOGRAPHS

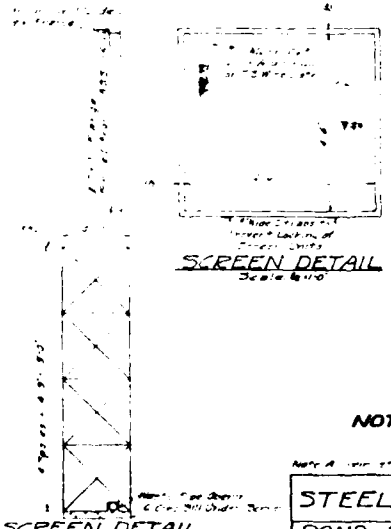


PLAN SHOWING TOP REINFORCING



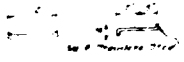
SECTION THRU GATE STRUCTURE SHOWING REINFORCING

SCREEN GUIDE DETAIL

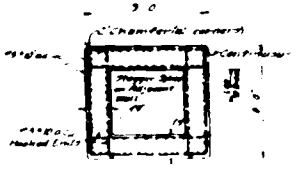


SCREEN DETAIL

SCREEN DETAIL



DETAIL OF LADDER RUNGS



PLAN SHOWING ARRANGEMENT OF HORIZONTAL STEEL

NOT TO SCALE

STEEL DETAILS OF DAM

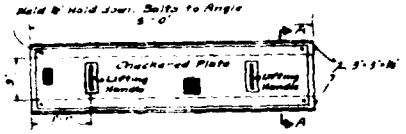
POND BROOK RESERVOIR

FIRE DISTRICT NO 3

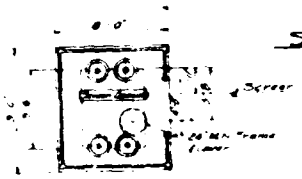
COLCHESTER, VT

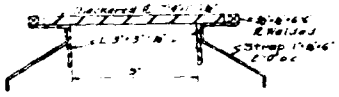
WHITMAN & HOWARD, INC.

ENGINEERS

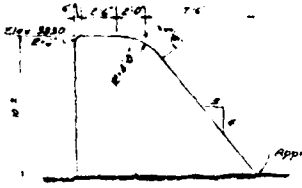


SCREEN OPENING DETAIL
Scale 1"=1'0"

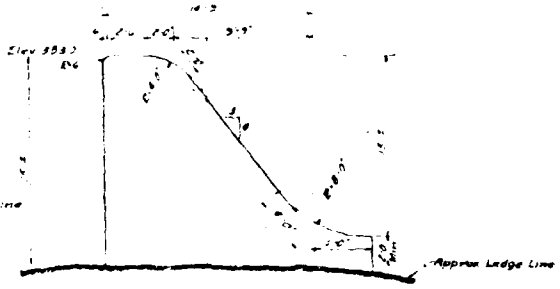




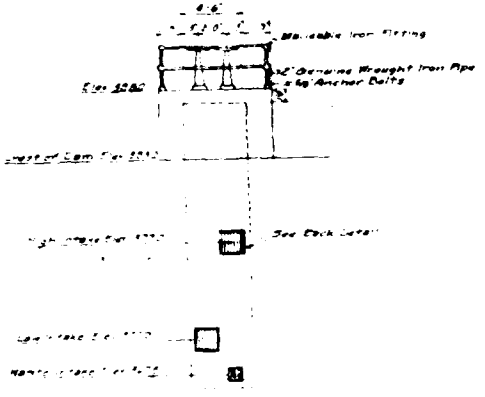
SECTION A-A
Scale 3"=1'0"



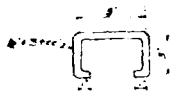
TYPICAL SECTION
STA 2+28 TO 2+50
Scale 1/4"=1'0"



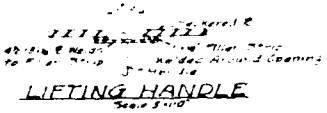
TYPICAL SECTION STA 2+08 TO 2+28
Scale 1/4"=1'0"



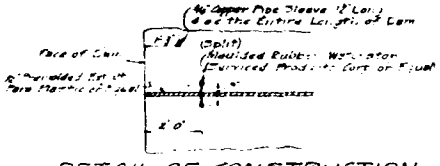
GATE STRUCTURE
Scale 1/4"=1'0"



HANDLE
Scale 3"=1'0"

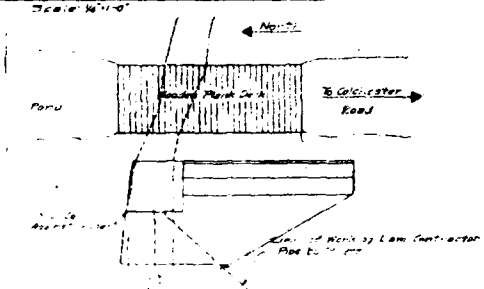


LIFTING HANDLE
Scale 3"=1'0"

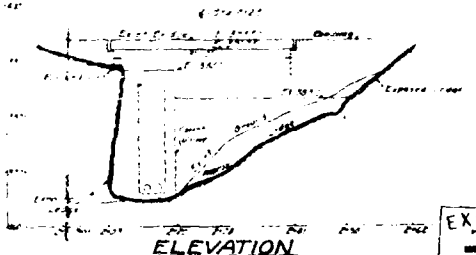


DETAIL OF CONSTRUCTION JOINT
Scale 1/4"=1'0"

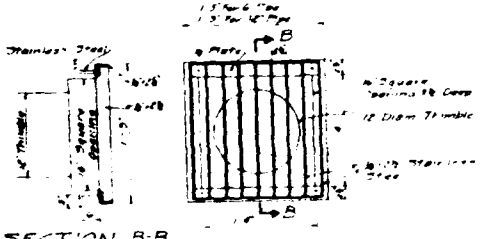
SECTION THRU WASTE PIPE
Scale 1/4"=1'0"



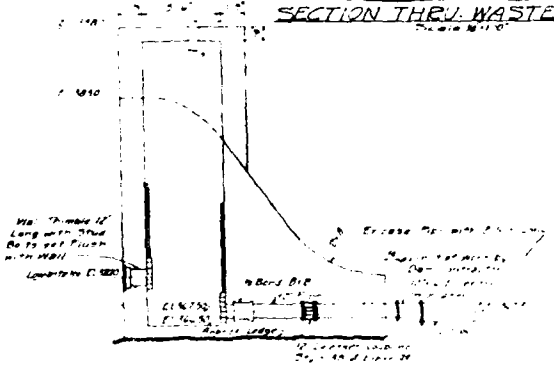
PLAN OF DAM
Scale 1"=10'



ELEVATION
Scale 1"=10'



SECTION B-B
RACK DETAIL
Scale 1"=1'0"



NOT TO SCALE

EXHIBIT

DETAILS OF DAM
POND BROOK RESERVOIR
FIRE DISTRICT NO 3
COLCHESTER, VT
WHITMAN & HOWARD, INC.
ENGINEERS

The concrete in the dam shall have a minimum compressive strength of 2,000 pounds per square inch, and in the gate structure of 3,000 pounds.

The maximum slump shall be 2-1/2 inches.

Test cylinders will be tested for compressive strength in accordance with ASTM- # 39.

All concrete shall be deposited by means of a concrete bucket. Use of chutes will not be permitted.

The maximum height of any pour shall be 5 feet. A delay of five days in pouring adjacent monoliths.

One vertical construction joint will be required as shown on the drawings. The Contractor is to drill holes for grouting as directed by the Engineers. Grout pipes to extend one foot into ledge and through forms so grouting may be done after lower sections of dam have been poured.

1. Reservoir Clearing

The reservoir site shall be cleared of all trees, brush and bushes to within 6-inches of the ground. These materials, along with all slash, are to be disposed of by burning.

The proposed flow line of the reservoir is elevation 380.0. The limit of clearing shall be elevation 381.0 with a minimum distance of 10 feet horizontally from the flow line.

2. Stripping

All overburden at the dam site including loose or partially loose or seamy ledge that can be removed with bars, picks, paving breakers, etc. shall be removed and the solid ledge thoroughly cleaned with compressed air and water. The ledge foundation shall be approved by the Engineers a minimum of 12 hours before commencement of concrete operations.

3. Miscellaneous Metals

FOOTBRIDGE ELIMINATED IN REVISED PLANS

The footbridge beams shall be standard 6-inch wide flange beams.

The floor shall be type M 1"x 3/16" galvanized bars - subway grating.

The pipe rail fence shall be 2-inch standard genuine wrought iron.

The ladder rungs shall be stainless steel.

The intake racks shall be of stainless steel.

The fine screen shall be either stainless steel or aluminum.

4. Sluice Gates

The sluice gates shall be cast iron, bronze mounted Rodney Hunt or equal. The floor stands shall have Timken bearings. The stems shall be steel with threaded sections of bronze.

5. Concrete

The cement shall be a Portland cement, meeting all the requirements of the latest revision ASTM-C 150 and shall be Type II.

Air entraining agent shall be used. The maximum percent of air entraining shall be 3 percent by volume.

SPECIFICATION FOR

CONSTRUCTING STORAGE RESERVOIR AND DAM

FIRE DISTRICT NO. 3

COLCHESTER, VERMONT

WHITMAN & HOWARD, INC.
ENGINEERS
89 Broad Street
Boston, Mass.

MARCH, 1960

WHITMAN & HOWARD, INC.

EST. 1869 · INC. 1924

ENGINEERS

CHANNING HOWARD (1867-1958)
PAUL F. HOWARD
EDWIN M. HOWARD
C. ROGER PEARSON
C. P. WICKERSON
E. M. PITTENGER

89 Broad Street, Room 514 · Boston 10, Massachusetts

HAncock 6-1633

March 17, 1960

Mr. Reinhold W. Thieme
Commission of Water Resources
Water Conservation Board
Montpelier, Vermont

Dear Mr. Thieme:

We are enclosing two sets of plans and specifications for the proposed dam for Colchester Fire District No. 3. The District is sending you the application and copy of letter to the Selectmen.

Yours very truly,

WHITMAN & HOWARD, INC.

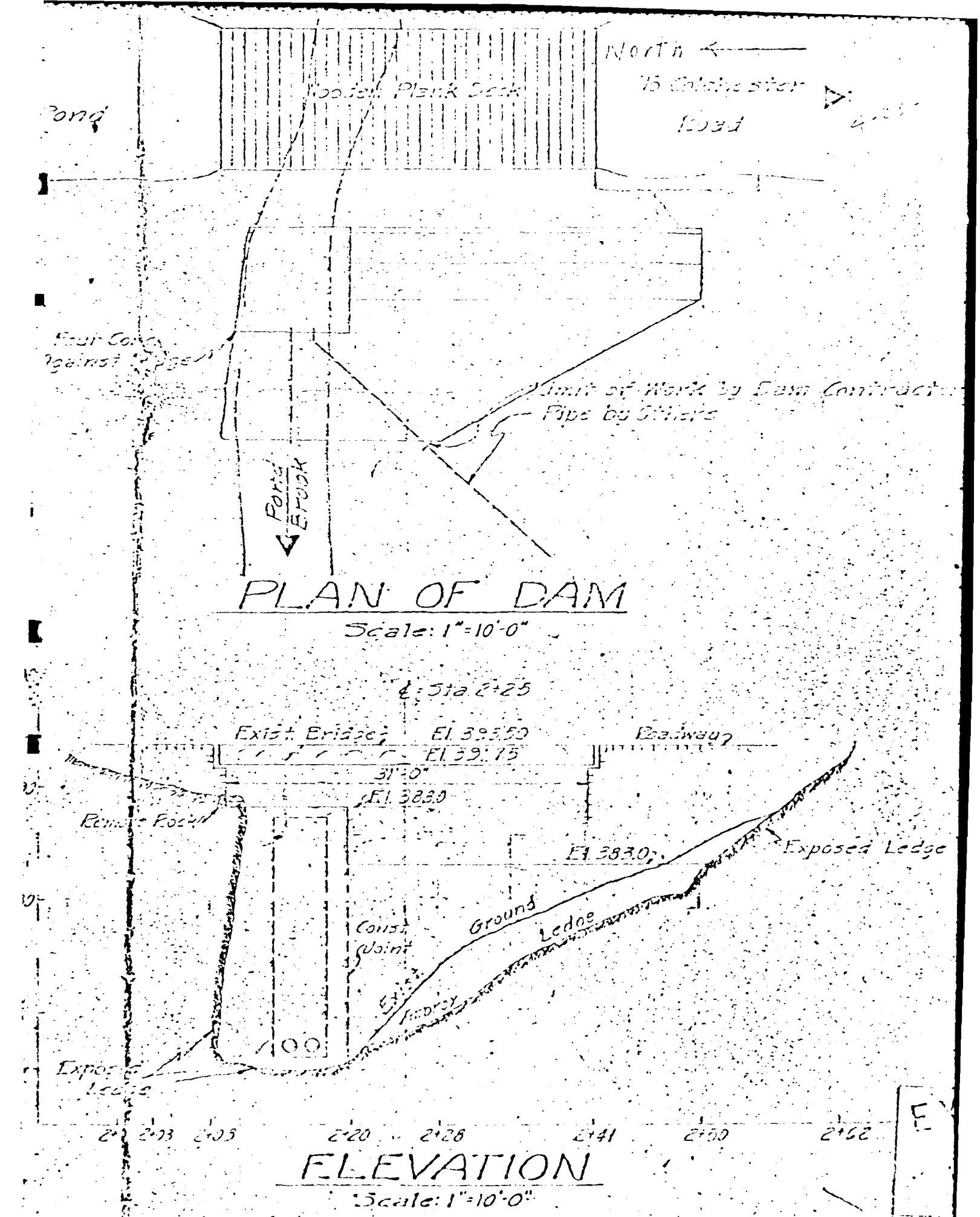
By Roger Pearson

c/c Mr. A. Grant Kennedy, Chairman
Prudential Committee
Fire District No. 3
Colchester, Vermont

ROUTING

		DAT.
FILE		3-18
SEC		
FILING	DUPL	

Our 92nd Year of Continuous Service


North
Woodsell Plank Deck
Pond
Limit of Work by Dam Contractor
Pipe by Others
Pond Brook
PLAN OF DAM
Scale: 1"=10'-0"
℄ Sta 2+25
Exist. Bridge
El 39.50
El 39.15
Roadway
31'-0"
El 38.0
Remove Footing
El 38.0
Exposed Ledge
Const. Joint
Ground
Ledge
Footing
Exposed Ledge
2+03
2+05
2+20
2+28
2+41
2+50
2+62
ELEVATION
Scale: 1"=10'-0"

WHITMAN & HOWARD, INC.

EST. 1869 · INC. 1924

ENGINEERS

CHANNING HOWARD (1867-1958)

PAUL F. HOWARD
EDWIN M. HOWARD
C. ROGER PEARSON
C. R. WICKERSON
L. M. PITTENDREIGH

89 Broad Street, Room 514 · Boston 10, Massachusetts

HAncock 6-1633

April 28, 1960

Mr. Reinhold W. Thieme
Commissioner of Water Resources
Water Conservation Board
Montpelier, Vermont

Dear Mr. Thieme:

April 29, 1960

We are enclosing two sets of revised Plans for the proposed Dam for Fire District No. 3, Colchester, Vermont.

1. Detailed surveys since the snow has melted indicate the ledge to be higher and the crest of the Dam has been raised to 383.0. No change was made in the typical section of the Dam. The higher elevation also will eliminate some low areas in the Reservoir.

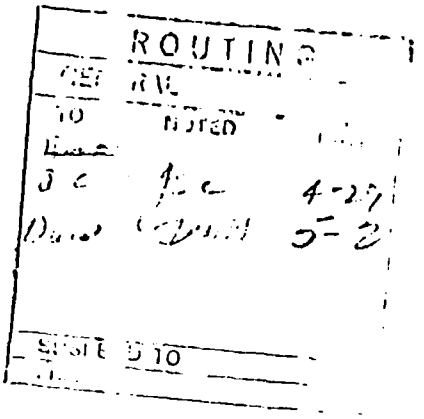
2. The Intake Structure was moved to the North end of the Dam to take advantage of a ledge projection and thus eliminate a foot-bridge and pier.

Yours very truly,

WHITMAN & HOWARD, INC.

By C. Roger Pearson

c/c Mr. Daniel Healey
Colchester, Vermont



Our Good Name of Craftsmanship Since 1869

State of Vermont

AGENCY OF ENVIRONMENTAL CONSERVATION
MARTIN L. JOHNSON, Secretary
Montpelier, Vermont 05602
DEPARTMENT OF WATER RESOURCES

August 29, 1974

Department of Fish and Game
Department of Forests and Parks
Department of Water Resources
Environmental Board
Division of Environmental Protection
Division of Recreation
Division of Planning
Natural Resources Conservation Council

COLCHESTER POND
TOWN OF COLCHESTER
CHITTENDEN COUNTY

Colchester Pond is located in the Eastern corner of the town. Access to the pond area is by town highways 15, 17, and 23, the latter of which is also called Lost Nation Road and leads to the East shore of the pond and the lands the Wheelocks have offered the state.

The original pond surface area was 97 acres. In 1965 a dam was built on Pond Brook about 2000 feet downstream of the natural outlet of the pond. This dam raised the pond level approximately 17 feet to elevation 383 and increased the surface area to 182 acres. The date of the Water Resources Board order of permission was 7/15/60.

The Pond has a maximum length of 5500 feet, a maximum width of 2000 feet, a mean width of 1400 feet, and a shoreline length of 14,500 feet.

The watershed area is 1.8 square miles and the drainage area to surface area ratio is 6.3. The area is about 70% forests.

The dam is a concrete structure, 42 feet long, 17 feet high with an Ogee crest spillway 34 feet in length. The dam was constructed on exposed ledge formations and from a site visit on 8/27/74 it appears to be very good condition.

The pond and 25 feet back from the shoreline is owned by Colchester Fire District #3. The surrounding acreage is owned by seven individuals, with Wheelocks owning about one third of this.

The pond is no longer used as a water supply as the area is now served by the Champlain Water District. Public access is not provided, however, according to Mrs. Wheelock, there is some unauthorized recreational use of the pond.

Colchester pond is a Class "A" water.

LRF/st
Enclosure

VERMONT DEPARTMENT OF WATER RESOURCES

INFORMATION SHEET

Name of Dam Colchester Pond Town Colchester

Owner Colchester Fire District #3 Name of Stream Pond Brook

Address Colchester, Vt. 05446 Classification II

U.S.G.S. Coordinates: Lat. 44°-32'-55" Long. 73° 7'-31"

U.S.G.S. Maps Essex Center, Fort Ethan Allen Aerial Photos VT-6'-H 20-221 to 222

U.S.G.S. Elev. @ Spillway

Total Length of Dam 42 ft (40) Crest Width of Emergency Spillway 38 ft (38')

Width of Top 2½ ft Maximum Height 15 ft. 17' CREST OF SPILLWAY 23' TOP GATE STRUCTURE

Spillway Capacity: Principal Emergency

Pond Area 180 FA @ NWL Drainage Area 1.8 Sq. Mi.

Pond Volume: Normal Water Level 2000 AF Design High Water Level

Maximum Water Depth: Normal Water Level 15 ft. @ Dam Design High Water Level

Storage Before Emergency Spillway is Used None

Use of Reservoir Water Supply

Description of Dam: Concrete gravity with 6" ϕ gate drain pipe.

Description of Spillway(s): Ogee weir

Designed by Whitman & Howard Year Built 1935

Hearing Date May 12, 1960 Order Date July 15, 1960

Additional Remarks:

SUMMARY OF DATA AND CORRESPONDENCE

COLCHESTER POND DAM

EXISTING PLANS

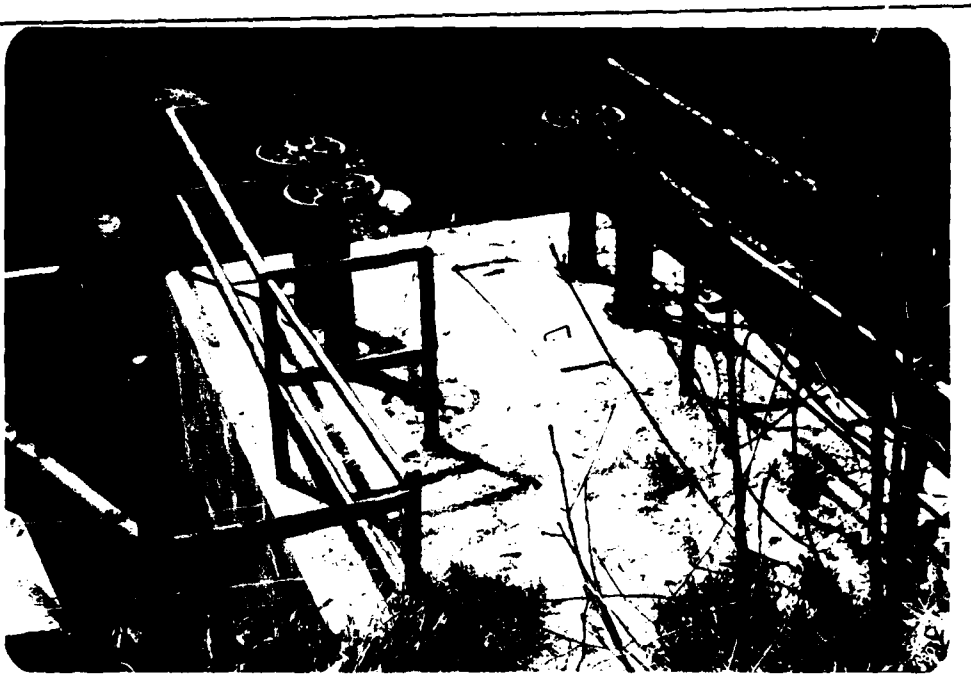
On file with Vermont Department of Water Resources:

1. Details of Dam - Pond Brook Reservoir
   Fire District No. 3 - Colchester, Vermont
   Whitman and Howard, Inc., Engineers - Boston, Mass.
   March, 1960 - Sheets 1 and 2
   Marked - "Revised, see sheets of April 29, 1960

2. Proposed Water System
   Fire District No. 3 - Colchester, Vermont
   Scale 1" = 2000' - November, 1959
   Whitman and Howard, Inc., Engineers - Boston, Mass.

On file with Fire District No. 3:

3. Details of Dam - Pond Brook Reservoir
   Fire District No. 3 - Colchester, Vermont
   Whitman and Howard, Inc., Engineers - Boston, Mass.
   March, 1960 - revised sheets 1 and 2

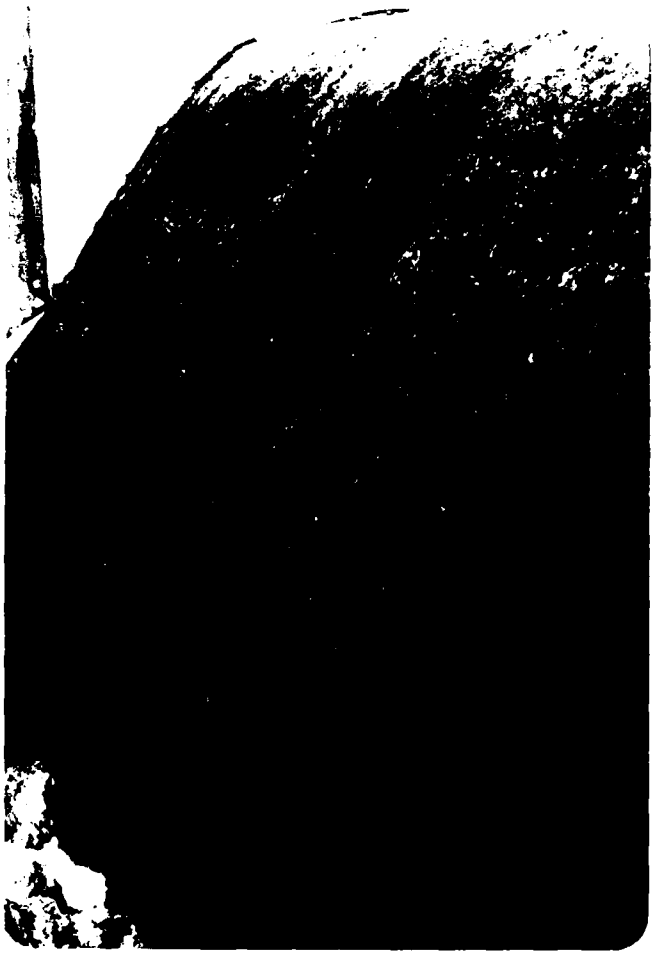


(1) Operating Platform

(2) Seepage at Right Abutment

(3) Bridge Abutment Directly Upstream of Left Abutment

(4) Spillway Crest and Gate Structure, With Roadway Bridge Abutments at Right



(5) Downstream Face of Concrete Ogee Spillway

(6) Spillway and Gate Structure

U.S.ARMY ENGINEER DIV, NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Colchester Pond Dam VT 00056 Colchester, Vermont May 6, 1980
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		C-4

(7) Spillway Crest with Bridge Abutment in Left Background

(8) 6" Low Level Drain at Left of Spillway Base

(9) Overview of Reservoir and Downstream Area

(10) Downstream Channel Immediately Below Dam

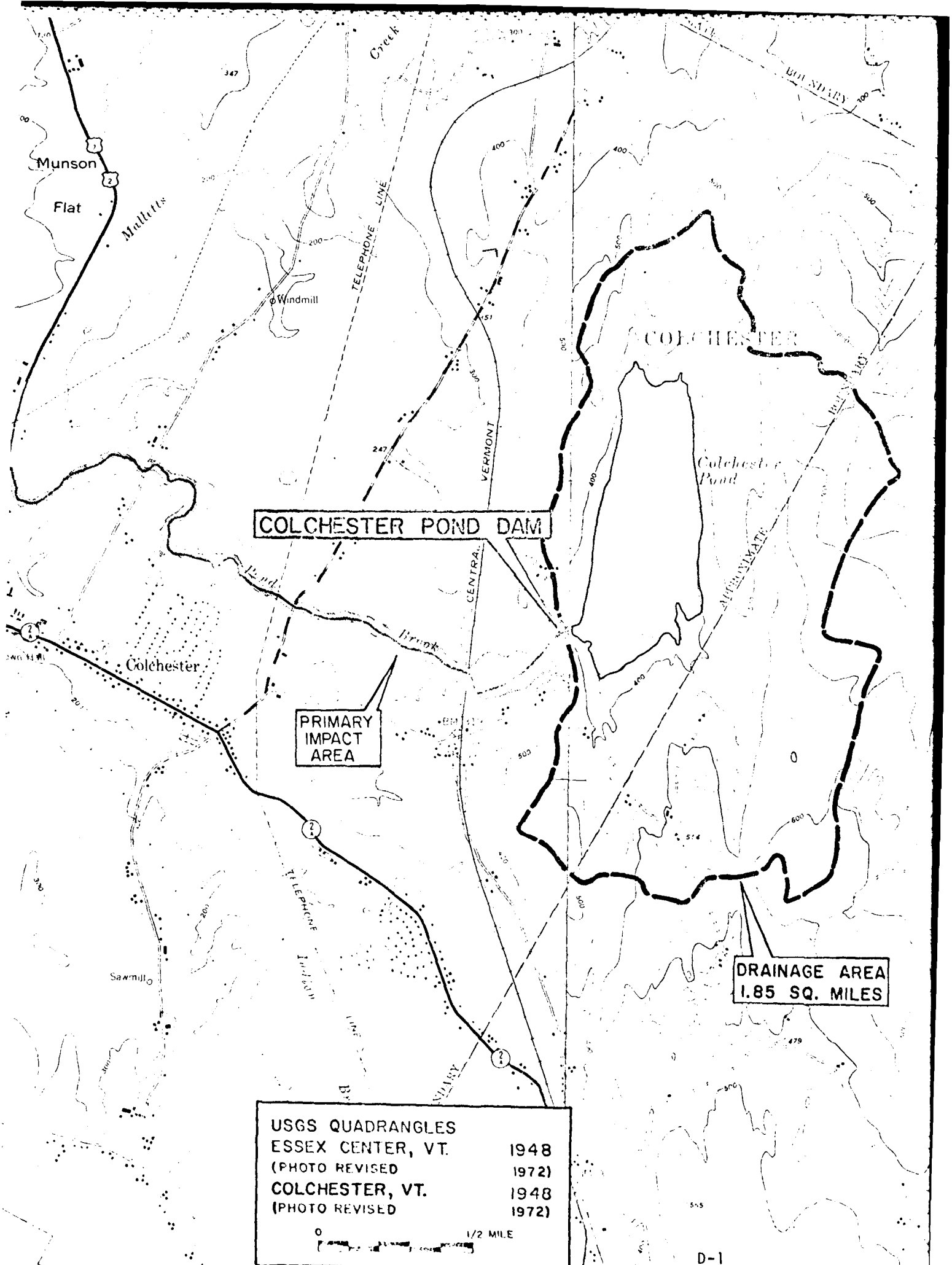
(11) Culvert Under Central Vermont Railroad Embankment

(12) Culvert Under Town Road, One Mile Downstream of Dam

U.S.ARMY ENGINEER DIV, NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Colchester Pond Dam VT 00056 Colchester, Vermont May 6, 1980
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		C-7

APPENDIX D

HYDRAULIC/HYDROLOGIC COMPUTATIONS


COLCHESTER POND DAM
PRIMARY IMPACT AREA
DRAINAGE AREA 1.85 SQ. MILES
Munson Flat
Colchester
Colchester Pond
Windmill
Sawmill
TELEPHONE LINE
VERMONT
CENTRAL
APPROXIMATE
Brook
Creek
USGS QUADRANGLES
ESSEX CENTER, VT. 1948
(PHOTO REVISED 1972)
COLCHESTER, VT. 1948
(PHOTO REVISED 1972)
0 1/2 MILE

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____ of_____

Subject_____

Computation_____ Job No._____

Computed by_____ Checked by_____ Date_____

Hydrologic / Hydraulic Inspection

I) Performance at Test Flood Conditions

1) Probable Flood

a) Watershed classified as "rolling"

b) Watershed Area

1.8 sq. mi. Vt Dept. of Water Resources Info.

1.8 sq. mi. (Flow for average of 3 trials) USGS

Streamflow Center, VT U.S. Water Conservation

c) From NEDAS Preliminary Guidance for Estimating Maximum Probable Discharges" + Guide Curve for PMF Peak Flow

PMF = 2150 cfs / sq. mile

d) Peak Inflow

PMF = 1.86 sq. mi. x 2150 cfs/sq. mi. = 4000 cfs

Similarly, ½ PMF = 2000 cfs

2) Test Flood

a. Classification of Size, Hazard & NED Guidelines

b. Spillway Design Flood

Height = 24' (Top of Dam to Streambed)

Storage Capacity at Spillway Crest = 0 Ac-ft

Storage Capacity at Top of Dam = 0 Ac-ft

Test Flood = ½ PMF

D-2

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____ of _____

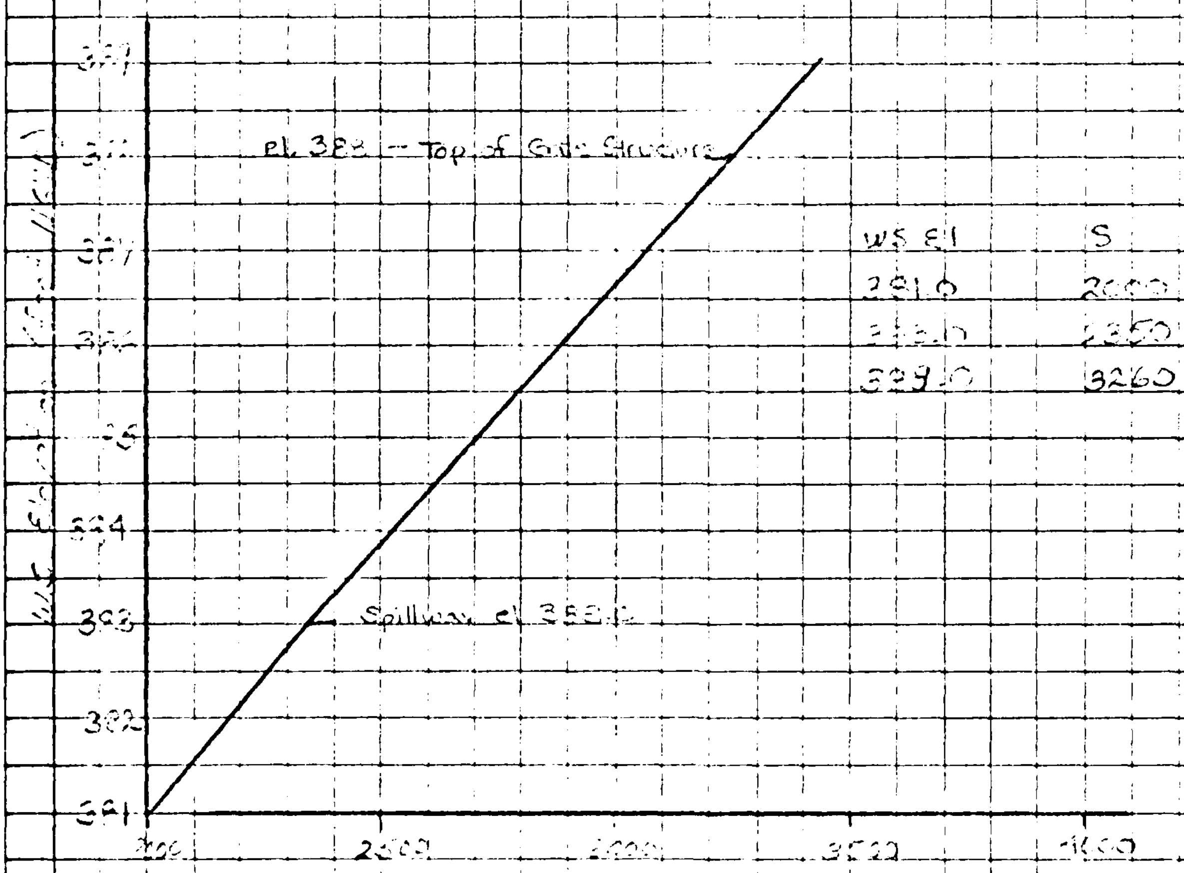
Subject: Inspection of [illegible]

Computation: Colchester Pond [illegible] Job No. _____

Computed by: MEB Checked by: [illegible] Date: 8-27-80

Stage - Storage Curve - Colchester Pond

[illegible] Dept. of Water Resources [illegible]
- surface area = 182 acres
USGS sheet [illegible] acres [illegible]
[illegible] 175 acres [illegible] spillway [illegible] 182 [illegible] el 388
[illegible] Dept. [illegible] Water [illegible]
[illegible] 15' [illegible] = 2010 acre-ft el. 391



JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet____of____

bject____

mputation____ Job No.____

mputed by____ Checked by____ Date____

2. Classification of Dam:

(a) Size Classification:

Based on Flow would have caused downstream to the Route Nine flood crossing during the 2:00 P.M. storm on the day. This is a well-traveled highway. Failure flow would have caused damage to a total of 1 mile of downstream additional structures.

(a) Classification:

Size: Intermediate

Hazard Classification:

b) PMF = 4000 cfs 1/2 PMF = 2000 cfs : Test Flood

3) Dimensions of Principal Spillway:

a) Peak Inflow: Test Flood @ 1/2 PMF = 2000 cfs

b) Outflow Rating Curve:

Spillway: L = 3' 2' Control Orifice

L = 21' Circular Orifice

Note: "

H	Q	W.S. El.
	76	

D-6

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ____ of ____

Project Inspection of penstock and dams in Town Forest

Computation Calculation of flow Calculation of Job No. 453-00 #

Computed by DER Checked by SDH Date 7-21-80

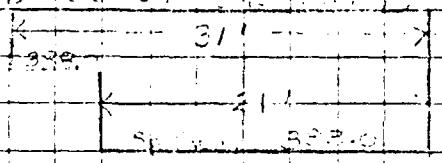
Crate Stage-Discharge $Q = CLH^{3/2}$ $C = 3.6$ $L = 10'$

H	Q	W.S.E.	
1	36	390.0	Note: One 6" low level orifice considered negligible in computations in rating curve
2	101	391.0	
2.57	145	391.57	

Pressure Flow due to Inlet Bridge

$Q = A\sqrt{2gH}$ $K = 1.5$ (From USACE Hydraulics Engineering Training Course)

$A = 215.67$ ft^2 Area 391.57 (Top of Road)



For Q = 2072 (flow just over road)

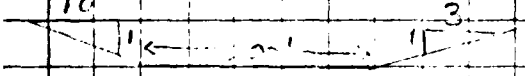
H = 2.15'

Top of Road 393.72 (USGS survey)

Bottom 391.57

2.15' ≈ 2.15' Assume no backwater effect due to presence of road bridge

Top of Rock elev 393.15 $Q = CLH^{3/2}$ $C = 2.6$



Flow calculated using weir equation at elevations shown

H	C	W.S.E.
1.0	5.23	394.75
2.0	7.39	395.75
2.1	7.51	395.85

Tailwater Rating curve plotted on page 5

c) Spillway Capacity at Top of Dam

H = 5.0' Cap. = 425 ($Q_p = 1/2 PMF$)

D) Surcharge Height for Q_p

$Q_{P_1} = 1/2$ PMF = 2000 cfs H = 8.3'

4) Effect of Surcharge at Maximum Practicable Discharge

a) Lake Bed Volume = 180 Ac-Ft *

* Ref: Dept. of the Interior, Geological Survey, Augusta, Me.
Topo. Sheet USGS 1:24000 A = 175 Ac. Lewiston

b) Assume Normal Pool Level at Spillway Crest (elev. 250 = 0')

c) Maximum Area = 1.85 mi² (see p.)

d) Detention (Q_p) at Various Surcharge Elevations

H = 0' V = 180 Ac-Ft x 0' = 0 Ac-Ft
S = 0 / 0.5 = 0

H = 2' V = 1.2 mi² x 2' = 3.69 Ac-Ft
S = 3.69 / 0.5 = 7.38"

Ref: Appendix Storage-Indication Curves
(1.5" max. freeboard in Reservoir)

$Q_{P_2} = Q_{in}$ (1 - S) for Q_{P_1} = 1/2 PMF:

H = 0' Q_{P_2} = 500
H = 2' Q_{P_2} = 1915 cfs

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____ of_____

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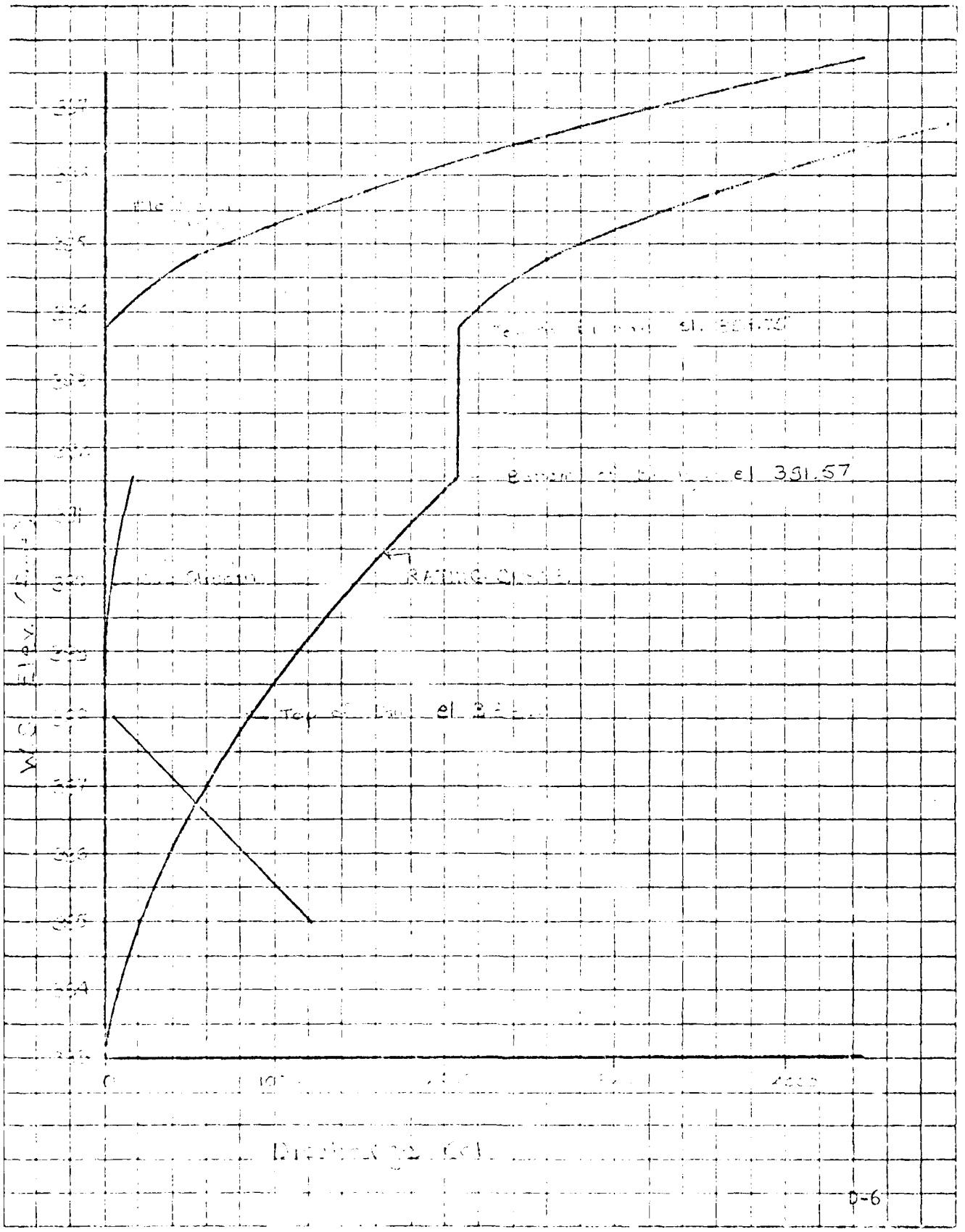
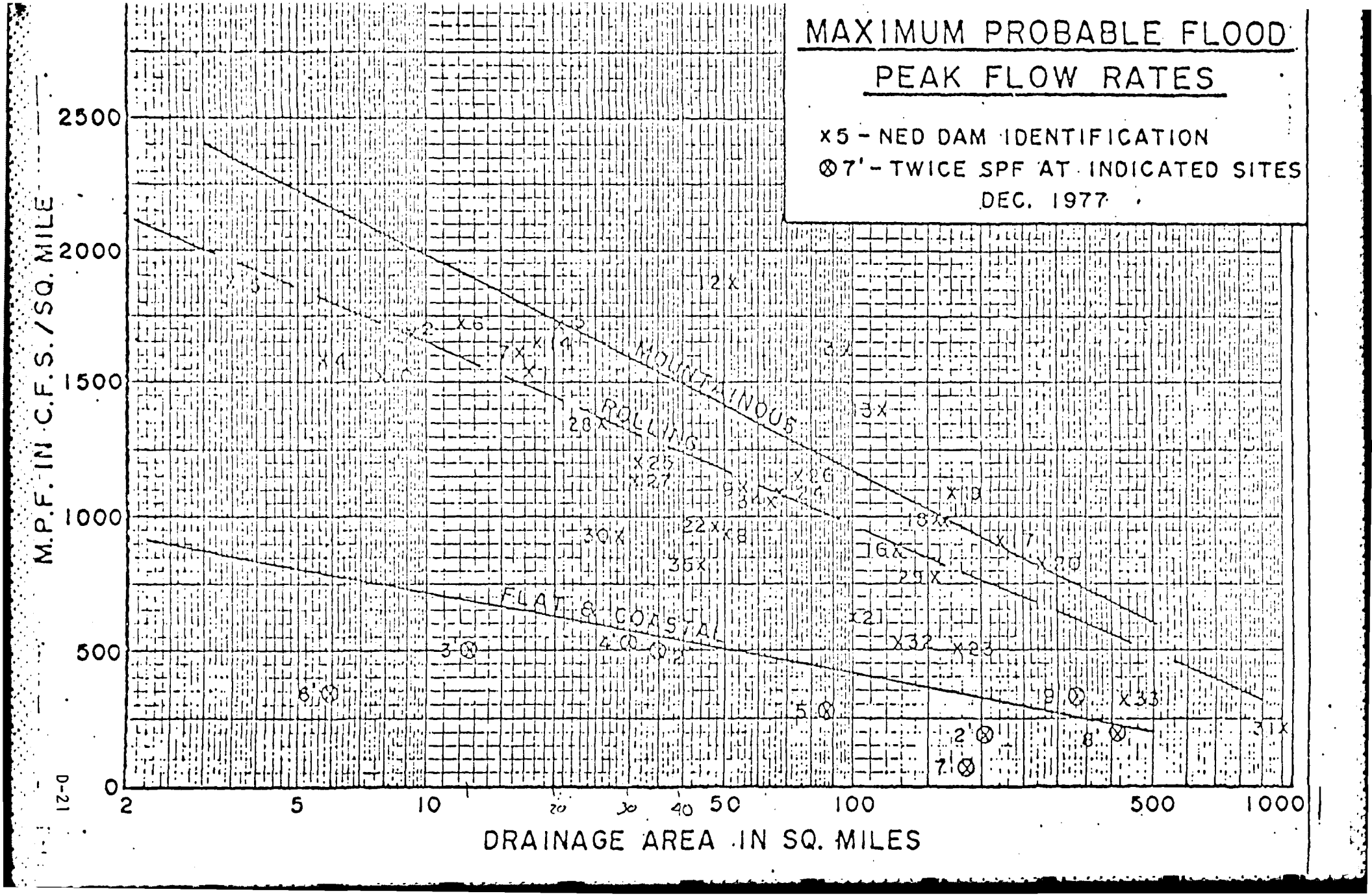
ted by_____ Checked by_____ Date_____




MAXIMUM PROBABLE FLOOD
PEAK FLOW RATES
x5 - NED DAM IDENTIFICATION
⊗7' - TWICE SPF AT INDICATED SITES
DEC. 1977
M.P.F. IN C.F.S./SQ. MILE
2500
2000
1500
1000
500
0
MOUNTAINOUS
ROLLING
FLAT & COASTAL
2
5
10
20
30
40
50
100
500
1000
DRAINAGE AREA IN SQ. MILES

MAXIMUM PROBABLE FLOWS BASED ON TWICE THE STANDARD PROJECT FLOOD (Flat and Coastal Areas)

River	SPF (cfs)	D.A. (sq. mi.)	MPF (cfs/sq. mi.)
1. Pawtuxet River	19,000	200	190
2. Mill River (R.I.)	8,500	34	500
3. Peters River (R.I.)	3,200	13	490
4. Kettle Brook	8,000	30	530
5. Sudbury River.	11,700	86	270
6. Indian Brook (Hopk.)	1,000	5.9	340
7. Charles River.	6,000	184	65
8. Blackstone River.	43,000	416	200
9. Quinebaug River	55,000	331	330

MAXIMUM PROBABLE FLOOD INFLOWS
NED RESERVOIRS

	Project	Q (cfs)	D.A. (sq. mi.)	MPF cfs/sq. mi.
1.	Hall Meadow Brook	26,600	17.2	1,546
2.	East Branch	15,500	9.25	1,675
3.	Thomaston	158,000	97.2	1,625
4.	Northfield Brook	9,000	5.7	1,580
5.	Black Rock	35,000	20.4	1,715
6.	Hancock Brook	20,700	12.0	1,725
7.	Hop Brook	26,400	16.4	1,610
8.	Tully	47,000	50.0	940
9.	Barre Falls	61,000	55.0	1,109
10.	Conant Brook	11,900	7.8	1,525
11.	Knightville	160,000	162.0	987
12.	Littleville	98,000	52.3	1,870
13.	Colebrook River	165,000	118.0	1,400
14.	Mad River	30,000	18.2	1,650
15.	Sucker Brook	6,500	3.43	1,895
16.	Union Village	110,000	126.0	873
17.	North Hartland	199,000	220.0	904
18.	North Springfield	157,000	158.0	994
19.	Ball Mountain	190,000	172.0	1,105
20.	Townshend	228,000	106.0(278 total)	820
21.	Surry Mountain	63,000	100.0	630
22.	Otter Brook	45,000	47.0	957
23.	Birch Hill	88,500	175.0	505
24.	East Brimfield	73,900	67.5	1,095
25.	Westville	38,400	99.5(32 net)	1,200
26.	West Thompson	85,000	173.5(74 net)	1,150
27.	Hodges Village	35,600	31.1	1,145
28.	Buffumville	36,500	26.5	1,377
29.	Mansfield Hollow	125,000	159.0	786
30.	West Hill	26,000	28.0	928
31.	Franklin Falls	210,000	1000.0	210
32.	Blackwater	66,500	128.0	520
33.	Hopkinton	135,000	426.0	316
34.	Everett	68,000	64.0	1,062
35.	MacDowell	36,300	44.0	825

PRELIMINARY GUIDANCE

FOR ESTIMATING

MAXIMUM PROBABLE DISCHARGES

IN

PHASE I DAM SAFETY

INVESTIGATIONS

New England Division
Corps of Engineers

March 1978

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet _____ of _____

Subject Inspection of Non-federal Dams in New England

Computation Colchester Pond Colchester Vt Job No. 953-05 H

Computed by MEB Checked by _____ Date 7-22-80

Summary

a) Peak Failure Outflow = 2800 cfs

b) Raise in stage just D/S from dam = 3.5'

c) Approximate stage before failure ± 6000 ft D/S of Dam
$Y_s = 5.25'$

d) Approximate stage after failure ± 6000 ft D/S of Dam
$Y_p = 9.0'$

e) Raise in stage ± 6000 ft D/S of Dam
$\Delta Y = 9.0 - 5.25 = 3.75'$

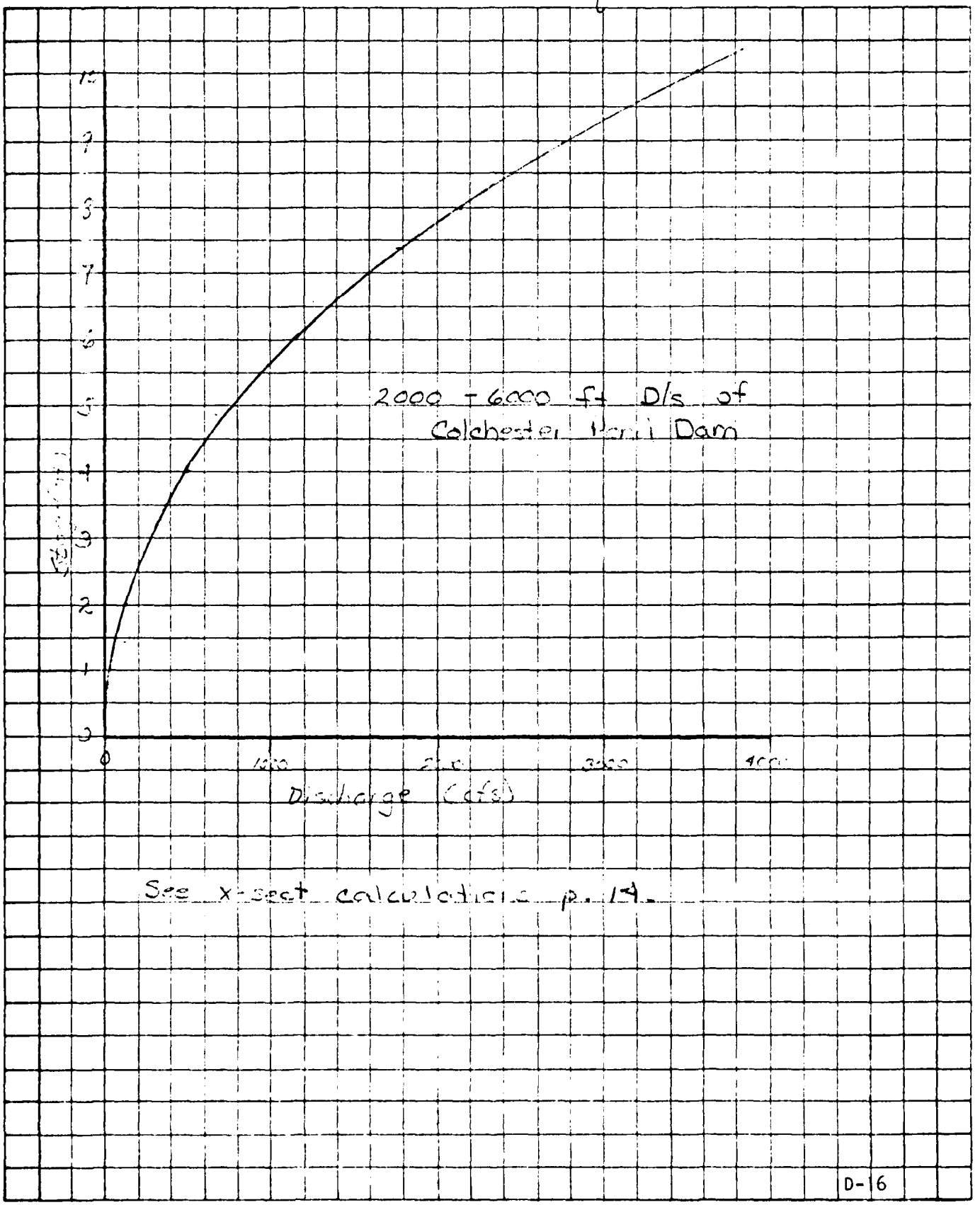
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____ of_____

Subject Inspection of [illegible]

Computation [illegible] Job No. [illegible]

Computed by [illegible] Checked by SDM Date 7-22-80



See x-sect calculations p. 14.

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____ of_____

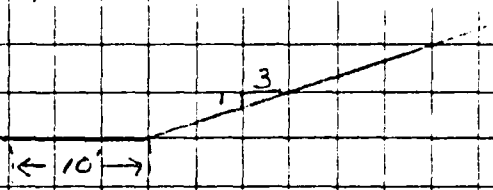
Subject Inspection of manufactured dams by Engineers

Computation Caledonia Pond Caledonia Vt Job No. 953-85 H

Computed by DEF Checked by SDM Date 8-27-85

1) Raise in stage 2000 - 6000 ft Dk of Dam

Approx X-section:



$Q = AV \quad V = \frac{1.486}{n} R^{2/3} S^{1/2}$

$S \cong .01$ (from USGS) $n \cong .045$

H	A	P	R	V	Q
2	30	20.[illegible]	1.44	4.22	126
4	80	31.59	2.53	6.13	491
6	150	42.97	3.49	7.67	1150
8	240	53.19	4.51	9.[illegible]	2164
10	350	63.99	5.47	[illegible]	3530

See graph p. 15

Stage for $Q_s = 850$ cfs $H = 5.25'$

Stage for $Q_p = 2800$ cfs $H = 9'$

Rated stage = 3.75'

No applicable staging in this river reach — Storage routing assumed unnecessary.

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____ of_____

Subject Inspection of non-federal dams

Computation Colchester Pond Calculation #4 Job No. 953-05H

Computed by DEF Checked by SDM Date 8-27-90

Pre-failure Volume = $\left(\frac{44.84 + 365.45}{2(43560)}\right) 1500 = 457.8$ ac-ft

Failure Volume = $\left(\frac{111.69 + 397.50}{2(43560)}\right) 1500 = 476.3$ ac-ft

Volume in Reach = 476.3 − 457.8 = 19.5 ac-ft

Q_{P_2} (trial) = $Q_{P_1}(1 - V_1/S)$

$= 2800\left(1 - \frac{18.5}{3260}\right)$

$= 2784$ cfs ≈ 2800 cfs

∴ Storage behind railroad bed does not attenuate peak flow significantly

c) Raise in stage at Road Crossing Approx. 1 mile DIs. from Dam

48" ACCMP, ± 30' long, 5' below road surface

$H = h_f + h_{ent} + h_{exit}$ $Q = AV$

$h_{ent} = .5\frac{V^2}{2g}$ $h_{exit} = 1.0\frac{V^2}{2g}$ $h_f = f\frac{L}{D}\frac{V^2}{2g}$ $f = .073$ $L = 30$ $D = 4$

H = 5' Q = 153 cfs before overtopping road

∴ Assume roadway overtopped and failed out prior to dam failure

Continuing further downstream there are no habitable structures lower than 40 feet above the streambed and the 1st residential structure would be endangered by dam failure U.S. Route 7 crosses Pond Brook approximately 13,000 ft downstream of the dam but would not suffer any major structural damage from flood flows.

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____ of_____

Subject Inspection of non-federal dams

Computation Colchester Pond Job No. 953-05 H

Computed by MEB Checked by SDM Date 3-25-

Assuming that the railroad crossing remains stable, it would dam up the stream up to 1500 feet upstream of the railroad bed, that is to say, 500 feet downstream of the dam. The first 500 feet of the downstream channel would be like the cross-section pictured on page 9. Computations indicate that there is no significant storage in this first downstream section so the storage computations shown here will start with the section 500 - 2000 feet downstream of the dam.

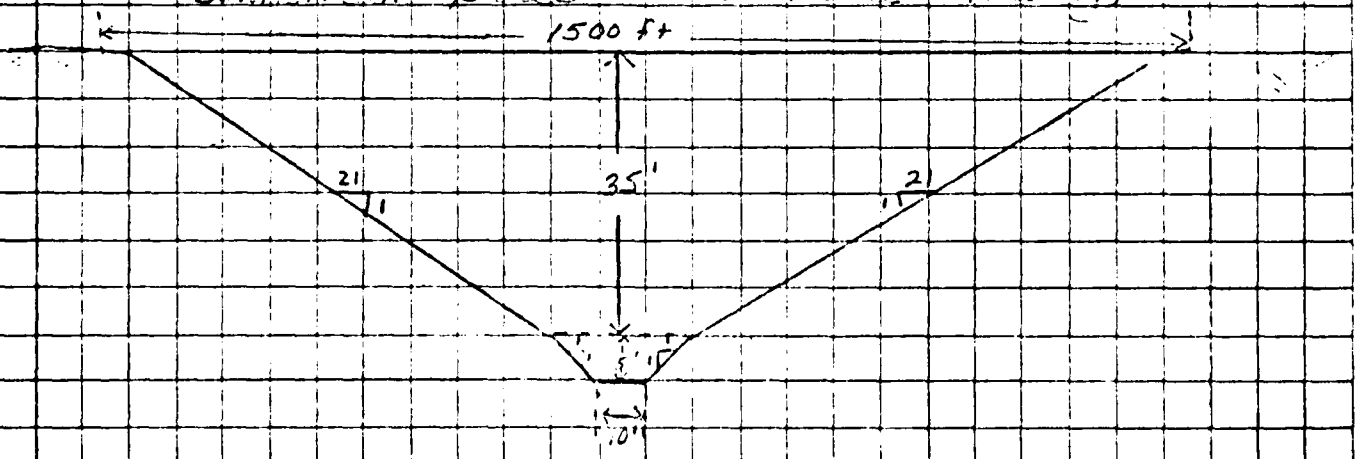
Reach 500 - 2000 ft DS of Dam
Railroad crossing at DS end of reach

Reservoir storage at time of failure = 3260 Ac-ft

Volume in stream reach available for storage
= Failure volume - Pre-failure volume
Failure Volume = $\left(\frac{\text{Upstream X-sect} + \text{Downstream X-sect}}{2}\right) L$

L = Length of Reach
Pre-failure volume similarly computed

Downstream X-sect (at Railroad Crossing)



JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____ of_____

Subject Inspection of non-federal dams in New England

Computation Colchester Point Colchester Vt Job No. 953-054

Computed by MEB Checked by SDM Date 2-27-80

D. Railroad crossing approx 2000 feet downstream east.

Flow over Railroad Tracks

$Q = CLH^{3/2}$ $C = 2.5$ L = [illegible]

H	Q
.1	119
.3	616 +
.5	1326
.7	2196
.9	3210

Stage - Discharge Curve
R. R. Crossing
Critical Section

Water Surface Elevation (ft. msl)

9
8
7
6
5
4
3
2
1
0

1000
2000

Discharge (cfs)

D-12

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____ of_____

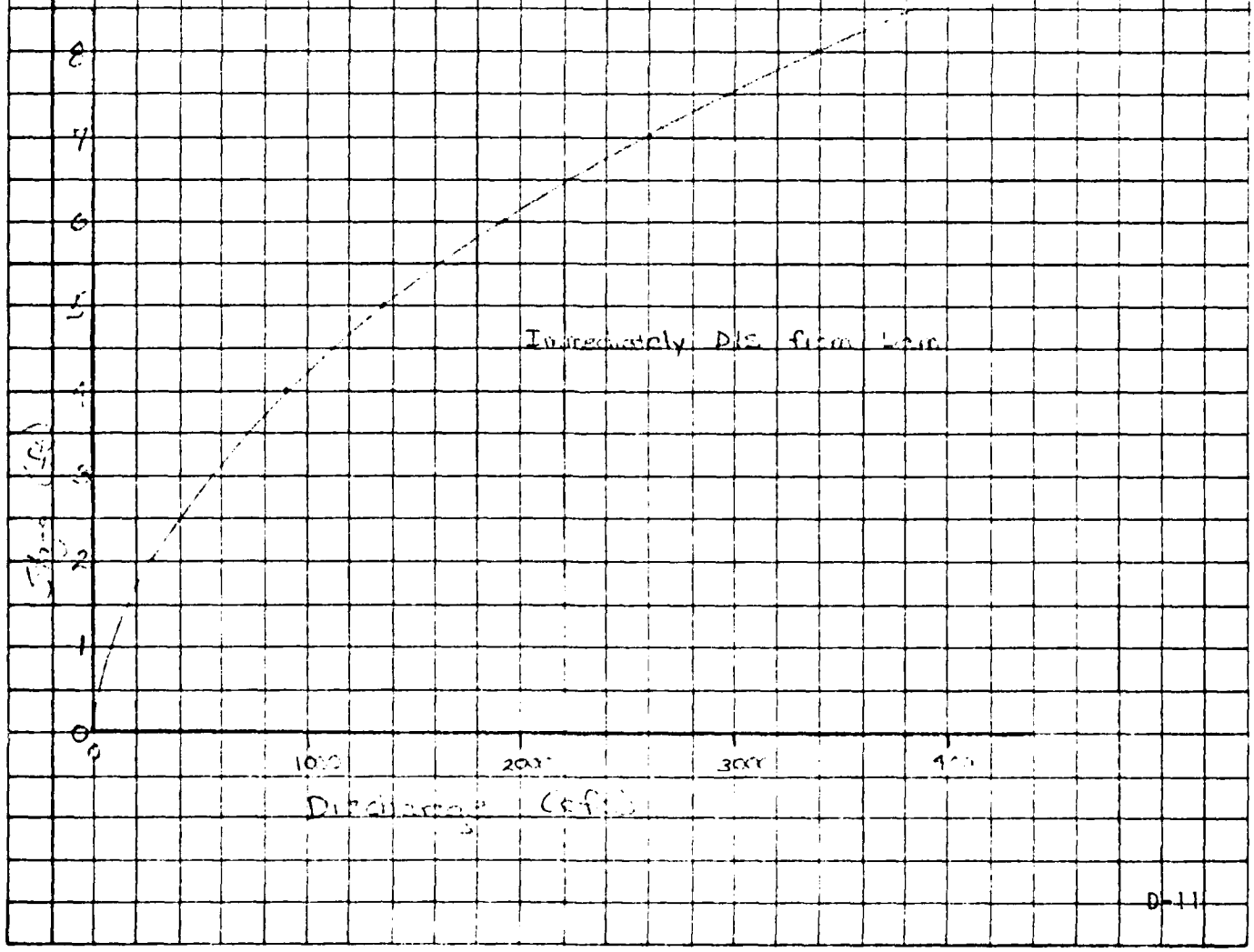
Subject Inspection of non-federal dams

Computation Colchester Pond Colchester Vt Job No. 858-05 H

Computed by MEE Checked by SDY Date 7-22-80

Immediately Downstream from Dam

H	A	P	R	V	Q
1	9	10.83	.83	9.09	81
2	20	13.66	1.46	13.19	264
4	48	19.31	2.49	18.77	901
5	65	22.19	2.93	20.99	1363
6	84	24.97	3.36	22.97	1930
7	105	27.80	3.78	24.72	2605
8	128	[illegible]	4.18	26.55	3401



D-11

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet____ of____

Subject Inspection of non-federal dams

Computation Colchester Pond Caldwell #4 Job No. 953-85 11

Computed by WEP Checked by SDM Date 3-25-86

a) Peak Failure Outflow

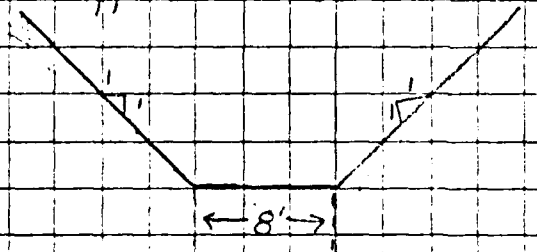
Peak Failure Outflow = Breach Outflow + Remaining Spillway Discharge

= 2854 + 403

= 3257 cfs say 2500 cfs

2) Peak Flood and Stage - Downstream River Reaches

a) Immediately Downstream from the dam



$V = \frac{1.49}{n} R^{2/3} S^{1/2}$

n = .045 S = .04 (from USGS)

Pre-failure Flow = 850 cfs H = 3.8' (see curve on following page)

Failure Flow = 2871 cfs H = 7.3' "

Rise in stage = 7.3 - 3.8 = 3.5 feet

b) Railroad crossing approx. 2000 ft downstream

60" ACCMP + 25' long, + 35' long track

$H = h_f + h_{ent} + h_{exit} + h_{ent} \quad Q = AV$

$h_{ent} = .5 \frac{V^2}{2g} \quad h_{exit} = 1.0 \frac{V^2}{2g} \quad h_f = f \frac{L}{D} \frac{V^2}{2g} \quad f = 1.06$

H = 3.8' Q = [illegible]

Actual [illegible] through railroad [illegible]

Check culvert [illegible]

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet____ of____

Subject Inspection of [illegible] Dam

Computation Calculation Power Calculation #4 Job No. 952-[illegible]

Computed by MEB Checked by SDM Date 2-21-[illegible]

II Downstream Failure Hazard

1) Peak Failure Outflow [illegible] Surface to [illegible]

a) Breach Outflow

i) Breach Width W_b

Mid-Height Elev = 372' NGVD (397 - 25/2 = 384.5)

Approx. Mid-Height Length = 28' (From 1"=40' Drawing)

Breach Width Case I, F.E.D. - HEC D/S Dam Failure Guidelines: $W_b = 0.4 \times 28' = 11.2$ feet

ii) Height h_b

Height at time of failure = 25'

iii) Breach Outflow

$Q_b = 8/27 \, W_b \sqrt{g} \, h_b^{3/2}$ $W_b = 11.2$ $h_b = 25$

$Q_b = 2351$ cfs

b) Remaining Spillway Discharge

Assume breach within spillway section

21' - 11' = 10' Length

$Q = CLH^{3/2}$ $L = 10$ $C = 3.2$

H		
5		

[illegible] Spillway [illegible] = 1[illegible]

Subject Inspection of [illegible]

Computation [illegible] Job No. 952-[illegible]

Computed by MSP Checked by JDM Date 2-27-80

e) Peak Outflow (Q_{P_3})

Using NED-ACE Guidelines "Simplified Streamflow Routing Alternate Method"

Q_{P_3} = 550 cfs H = 3.75' for Q_P = 1/2 PMF

f) Spillway Capacity to Outlet

Spillway capacity to Top of Low Dam = 550 cfs
Q_s = 155 % of the outflow at 1/2 PMF

Summary

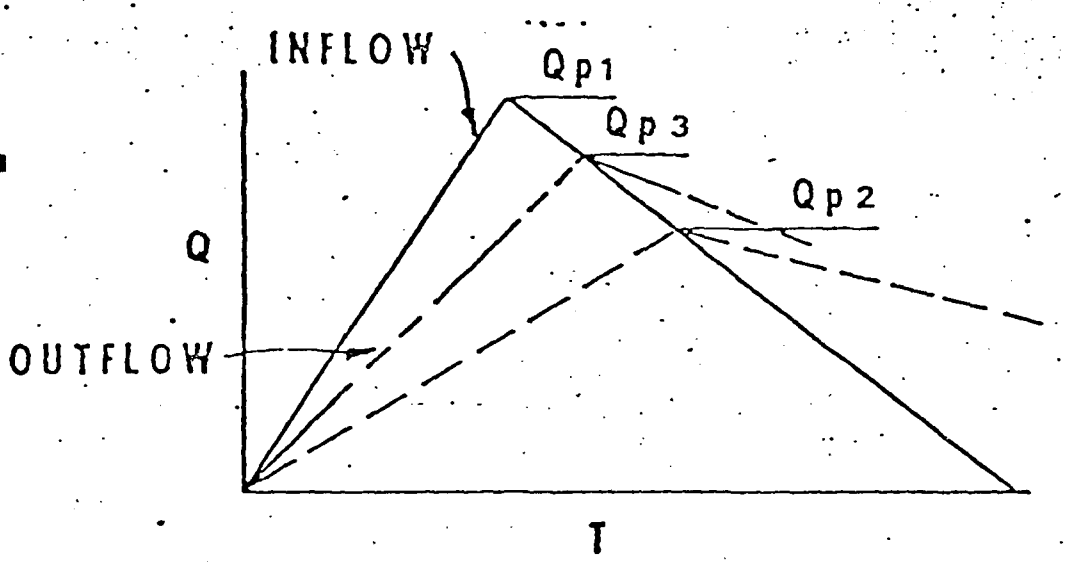
a) Peak Inflow
Test Flood = 1/2 PMF = 2000 cfs

b) Peak Outflow
Q_{P_3} = 550 cfs @ 1/2 PMF

c) Spillway Max Capacity
Q_s = 550 cfs or 155 % of Q_{P_3}

Therefore, at Test Flood = 1/2 PMF, the spillway barrier will safely pass [illegible] of its capacity with no surcharge above the spillway crest of 3.75 ft.

ESTIMATING EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES



STEP 1: Determine Peak Inflow (Q_{p1}) from Guide Curves.

STEP 2: a. Determine Surcharge Height To Pass "Q_{p1}".

b. Determine Volume of Surcharge ($STOR_1$) In Inches of Runoff.

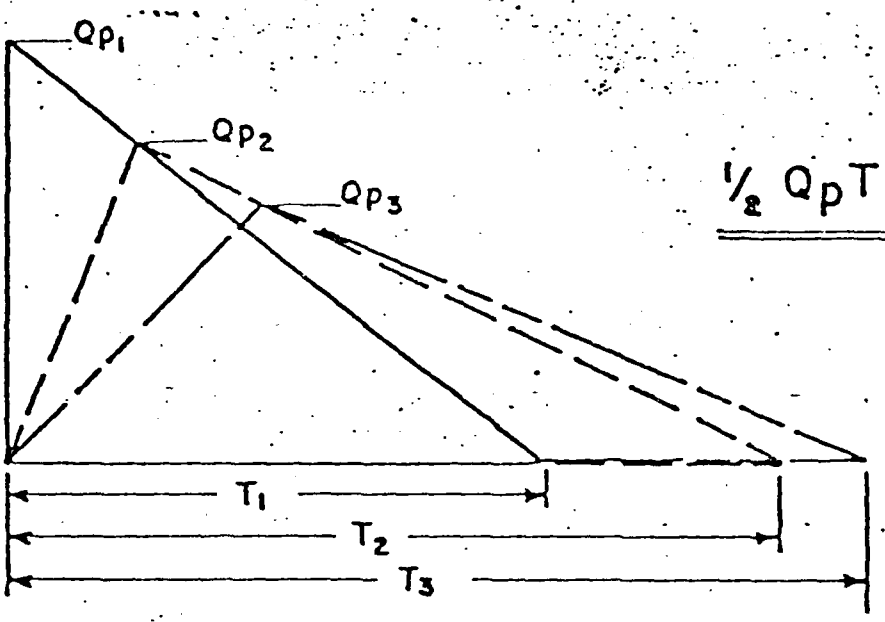
c. Maximum Probable Flood Runoff In New England equals Approx. 19", Therefore;

$$Q_{p2} = Q_{p1} \times \left(1 - \frac{STOR_1}{19}\right)$$

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Q_{p2}"

b. Average "$STOR_1$" and "$STOR_2$" and Determine Average Surcharge and Resulting Peak Outflow "Q_{p3}".

"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS



$\frac{1}{2} Q_p T = 12 S$

STEP 1: DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

STEP 2: DETERMINE PEAK FAILURE OUTFLOW (Q_{p1}).

$$Q_{p_1} = \frac{8}{27} W_b \sqrt{g} Y_o^{3/2}$$

W_b = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

Y_o = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

STEP 3: USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

STEP 4: ESTIMATE REACH OUTFLOW (Q_{p2}) USING FOLLOWING ITERATION.

A. APPLY Q_{p1} TO STAGE RATING, DETERMINE STAGE AND ACCOMPANYING VOLUME (V_1) IN REACH IN AC-FT. (NOTE: IF V_1 EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL Q_{p2}.

$$Q_{p_2}(\text{TRIAL}) = Q_{p_1}\left(1 - \frac{V_1}{S}\right)$$

C. COMPUTE V_2 USING Q_{p2} (TRIAL).

D. AVERAGE V_1 AND V_2 AND COMPUTE Q_{p2}.

$$Q_{p_2} = Q_{p_1}\left(1 - \frac{V_{avg}}{S}\right)$$

STEP 5: FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

APPENDIX E

INFORMATION AS CONTAINED IN

THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	ENTITY NUMBER	DIVISION	STATE	COUNTY	CONGR DIST.	STATE	COUNTY	CONGR DIST.	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY	MO	YR
T	Sc	NED	VT	007	01				COLCHESTER POND	4432.9	7307.5	15	OCT	80

POPULAR NAME	NAME OF IMPOUNDMENT
	COLCHESTER POND

REGION	BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	DIST FROM DAM (MI.)	POPULATION
01	01	POND BROOK	COLCHESTER	1	

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT.)	HYDRAULIC HEIGHT (FT.)	IMPOUNDING CAPACITIES MAXIMUM (ACRE–FT.)	IMPOUNDING CAPACITIES NORMAL (ACRE–FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
PG	1965	R	25	20	3260	2350	NED	N	N	N	N	15OCT80

REMARKS
33-DRIG CONSTR FOR WATER SUPPLY

DIST	SPILLWAY LENGTH	SPILLWAY TYPE	SPILLWAY WIDTH (FT.)	MAXIMUM DISCHARGE (CFS)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO.	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
	62	U	30	850												

OWNER	ENGINEERING BY	CONSTRUCTION BY
COLCHESTER FIRE DISTR #3	WHITMAN + HOWARD	

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
WATER RESOURCES BD	WATER RESOURCES BD	WATER RESOURCES BD	WATER RESOURCES BD

INSPECTION BY	INSPECTION DATE DAY	MO	YR	AUTHORITY FOR INSPECTION
J W SEWALL CO FOR CORPS OF ENGRS	06	MAY	80	CONTRACT NO. DACW 33-80-C-0051

REMARKS

END

FILMED

9-85

DTIC